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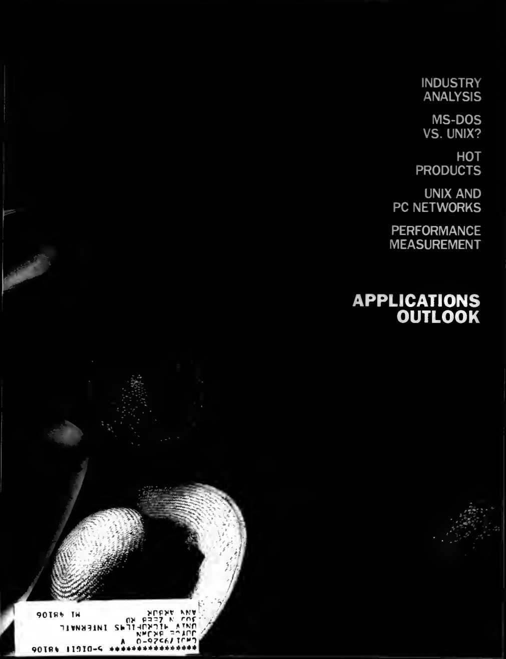

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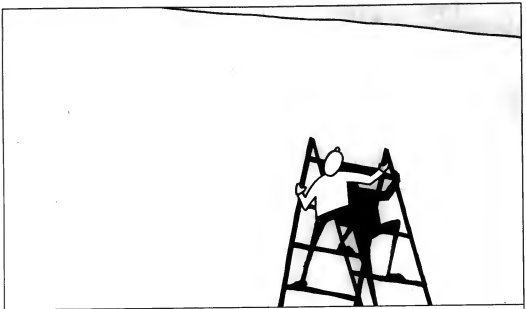

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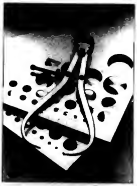

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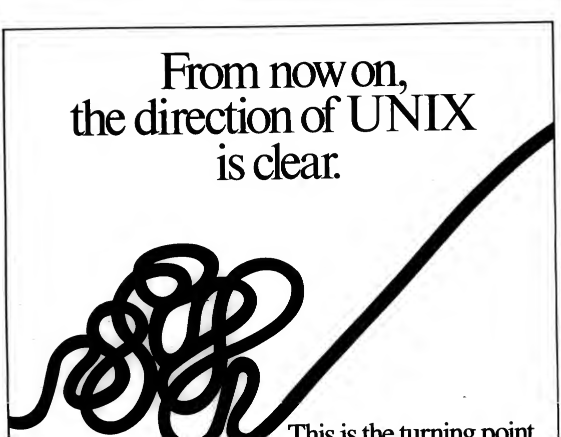

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UNIX VIEWPOINT

EDITORIAL

Nix Unix? Not Yet

Those of you who have been in the industry for any length of time have seen a number of different technologies and buzzwords arrive on the scene with much fanfare only to fall back into obscurity. Vendors tout the idea, the press leaps on a new buzzword and, more often than not, users never seem to get around to ordering it.

While this is not really the case with Unix, some similarities exist. When Unix became commercially available, vendors and some ardent fans proclaimed that Unix was the best thing since sliced bread. In the past few years, these people have been administered a strong dose of reality. Although it is clearly not the total solution, Unix will become an important, if unobtrusive part of an overall system architecture.

The one-time rivalry between Microsoft Corp. MS-DOS and Unix also seems to be cooling down. Unix advocates watched the rapid rise of the personal computer running MS-DOS. Buyers flocked to the microcomputer, shunning Unix with its lack of software and difficult user interfaces. However, users have now grown tired of their single-user systems and are looking to multiuser systems and networking capabilities. Since MS-DOS and Unix each have much to offer in this new world, vendors are realizing it may be to their advantage to make these environments coexist rather than fight.

Many major computer vendors are now offering Unix to their customers. This may be a result of market pressures for an MS-DOS connection and from a user need for multiuser systems rather than from a strategic commitment to Unix. But Unix is also becoming an important and oftentimes dominant operating system in certain key markets like supercomputers, electronic publishing and departmental computing.

Unix is not necessarily being accepted for itself but for what it can do. Its more technical characteristics have often obscured the system's commercial applications possibilities. These attributes were for programmers, not users, and therefore, software vendors tended to avoid Unix. Vendors have learned, however. Many have begun providing value to their Unix-based systems that will appeal to business users. Custom software and interfaces, IBM connections and connectivity within systems from the same vendor are starting to appear. The real benefit of Unix, of course, will be when it can provide file compatibility across different vendors' systems to be used as a distributed operating system.

Unix has had a varied history. Users justly shied away from it when they were being told it was *the* definitive operating system. Yet as users' needs change toward increased capabilities and networking, Unix can be of real value. And users are starting to realize it.

Sound But No Fury

INSIDER

Timothy J. Caffrey

Unix is like the Little Engine That Couldn't — it won't pull buyers off the sidelines or generate new market opportunities — at least not on its own. The idea that Unix is a marketing concept gone bust can be misleading, however. Unix will still play an important, if somewhat understated, role in emerging systems architectures.

The most significant long-term impact of Unix will be in defining small- and medium-scale processor operating environments. The steady convergence of Unix and Microsoft Corp. MS-DOS is already forcing a reassessment of the shape of personal and departmental computing. And, while Unix technology informs new generations of operating systems, analysis of Unix marketing claims yields a new set of tangible planning options.

The most compelling case for Unix today is based on its potential to substantially reduce the costs of hardware and software acquisition and of application development and maintenance. This argument has three broad points.

First, Unix affords an alternative to the quasi-monopoly pricing of large systems. The artificially high pricing structure for mainframe systems and software is being challenged by the price/performance of new, commodity microprocessor-based systems. Unix is perhaps the most tangible means of taking advantage of these new economies of small while avoiding the pricing strategies of market leaders.

Compounding the issue of technical sophistication is the argument that market leaders such as IBM and Digital Equipment Corp. will resist the emergence of Unix as a standard, portable operating system. While DEC, IBM and others offer Unix as an option on their processors, they do so in response to market pressures and not out of a strategic commitment to Unix. The influence of these market leaders will make a Unix buy more costly in the near term.

In addition to the subtle opposition of market leaders, Unix suffers from lack of a white knight. AT&T has repeatedly failed to follow through on its self-proclaimed role as Unix market mentor. The resulting loss of momentum has allowed IBM to advance de facto standards that will reduce the technical attractiveness of Unix.

Finally, when all other attacks have been exhausted, the naysayers point to a continued lack of good off-the-shelf Unix utilities and applications.

The second point is that a uniform programming environment like Unix could allow more efficient use and deployment of application development and maintenance personnel and resources. Adopting Unix as a standard across processors would eliminate the need to support multiple operating environments and reduce the rate of increase for expenditures for application development and maintenance.

Finally, a standard operating environment would increase the portability of applications across processors. Closely related to the point above, the promise of portability would allow for greater flexibility in systems deployment and reduce costs of hardware and software migration.

The case for Unix outlined above obviously does not stand unchallenged. Opponents generally acknowledge the potential cost-savings. However, their argument counters this potential with a claim that the momentum required to produce these cost-savings will not quickly emerge.

The first splash of cold water comes in the claim that Unix is technically unsophisticated and unproven in large implementations. Arguments about Unix's technical capabilities (or lack thereof) abound. While Unix has been successfully implemented in complex and sophisticated environments, these implementations have required considerable technical enhancements. In addition, Unix, unlike proprietary operating systems, is not optimized for specific hardware architectures. Thus, it is likely to require a high level of customization to yield optimum performance.

As a neutral observer, it is difficult to make an argument for Unix based on its visible merits. In the near term, a commitment to Unix appears to be justified largely by faith, not fact. A near-term commitment to Unix will involve high start-up costs. In the long term we are more likely to benefit from its legacy than its tangible presence.

Caffrey is vice-president, Office Automation Services, at International Data Corp. in Framingham, Mass.

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Seybold: Lack Of Software Slows Unix Acceptance

Patricia Seybold is the president of Patricia Seybold's Office Computing Group, a Boston market research firm. Seybold, who founded the company nine years ago, is seen by many as the Good Housekeeping seal of the office automation industry. And vendors turn to her for the "Seybold Seal of Approval."

Seybold has a line of office systems-related newsletters, which is headed by the company's flagship product, the "Office Systems Report." In February 1986, she began publishing "Unix in the Office," a newsletter that examines the quality of software and solutions provided by Unix. Seybold recently shared her perceptions on the state of Unix in the corporate environment with Computerworld Focus *senior writer Rebecca Hurst.*

How effectively are Unix vendors working to meet the needs of users?

Unix vendors are not working particularly well or hard to meet the needs of the office user. Their goals tend to be more centered on how to make software customizable for the value-added reseller [VAR] or OEM to whom they are selling.

What the user ends up with in terms of Unix office software really falls short in usability. The majority of Unix office applications do not have the integration and functionality of proprietary offerings such as those from Digital Equipment Corp., Wang Laboratories, Inc. or even IBM. Users may also stumble upon dead ends in the Unix software, and that's a user interface problem.

How will that affect these users' acceptance of Unix?

This will have a negative impact. In fact, it already has. Two of the earliest office software applications that came out in the Unix environment were the products from Interactive Systems, Inc. and Fortune Systems Corp. With Interactive's software, the problems had to do with functionality and the user interface. Fortune's interface was pretty good, but it had problems with bugginess and user support.

Part of the problem seems to be that Unix is a three-tiered market. You cannot fault a company like Quadratron [Software Co.] for not designing its software directly for the end user because that's not its market. The VAR is. You can fault the VAR for not adequately perceiving the size of the task it has in polishing the software. The VAR cannot just add value in terms of some vertical market application. It has to enhance the user interface, integration and support.

Q&A

Patricia Seybold

> *'Unix vendors are not working particularly well or hard to meet the needs of the office user.'*

What can the vendors, VARs and OEMs do to provide better applications for the end user?

Vendors must be more responsible for designing packages that can be sold as is to end users. They should give more thought to the large end user as one of their major markets and, therefore, should design turnkey systems for that market.

VARs should also pick up more responsibility and understand that they are not selling against personal computer dealers but against Wang, DEC, Data General Corp. and Hewlett-Packard Co. They need to know that the quality of the software, support and interface and the user's expectations are all quite a bit higher in mini marketplace, particularly in the office automation arena.

Do any Unix vendors provide competitive office system software?

The overall impression is that Unix software in office automation is not at good as the proprietary office software that's already out there. That is beginning not to be true. Applix, Inc. and Emerald City have office system software that actually surpasses the proprietary software of the major mini vendors.

How is the growth of vertical market applications contributing to the growth of Unix?

I see very few people doing multiuser vertical market software today that's not Unix. What this says is that if you're a small business or a targeted department within a large company with specific needs, and you try to find software to meet those needs, chances are much greater today than they were two years ago that that application is going to run in a Unix environment.

Why do you see that happening, and to what extent will this trend continue?

I see this trend because of the hardware. The Unix processors are so much more cost-effective than processors from the major minicomputer suppliers. And there are so many of them out there that the competition is fierce. This in turn keeps the prices low. . . .

There are still lots of shops for DEC VAXs, Wang minicomputers and IBM System/36s. There will always be companies that tie their star software product .

See **Q&A** page 8

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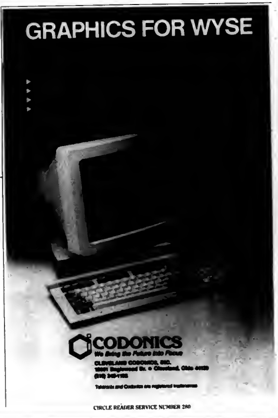

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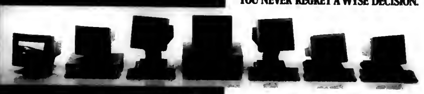

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Q&A from page 6

to a particular supplier. But, there's an increasing number of software houses that want the flexibility to be able to bundle a system that is going to give them the biggest return. They perceive that the cost and the reliability of the hardware is such that they can mark up the software dramatically and still come in at a competitive price.

How have the quality and availability of Unix application tools improved over the past two years?

There are some improvements I can point to. One is the fact that we seem to be standardizing on one version of Unix. Developers feel a little safer knowing that they're at least heading in the direction of AT&T System V. Also, a lot of the compilers are much more robust than they were two or three years ago.

Third, and most important for the office systems market, is that a lot of the software products available have front ends that are designed for a level of customizability and integration. This is particularly true for data base software, but it is also true for things like generic office software. The assumption is that programmers can tailor the applications or tie in their own applications in a few days rather than a few weeks. This ability of an application to tie in with other software increases its worth by 50%.

Do you expect System V and University of California at Berkeley 4.2 versions of Unix to converge?

Yes, the convergence of System V and Berkeley is inevitable, but Berkeley will still be around. There's always room for a renegade to come up with capabilities that AT&T is too slow to implement. System V will always try to subsume anything in Berkeley worth subsuming.

The impact of this convergence is a positive one. Currently, the myth of one Unix is a real stumbling block for end users. They think that they should go with Unix in-house because it gives them portability. Then they discuss it with the technical people who tell them that there isn't one Unix, that it's just like any other operating system. There are different versions, and you still have to modify Unix as you move from one environment to another. This is throwing a wet blanket on people's enthusiasm.

How viable is the Unix operating system in the corporate office?

Unix is a viable contender in the office. The traditional suppliers of office systems can be divided into two tiers. The top tier includes IBM, DEC, Wang and DG. The second tier includes everyone else. The majority of second-tier vendors are planning to migrate their software to Unix, and one of the top four may be planning to go to Unix.

There is a tacit agreement that if you don't already have a leading proprietary office automation solution, you have more flexibility by shifting to a Unix strategy. First, it's probably faster to develop in-house code in a Unix environment than it would be in a proprietary one. Second, it's easier to attract more third-party software vendors.

What interest do office users have in Unix?

Most users don't see Unix as relevant. It's rare to find customers who actually insist on Unix outside the government sector. In the federal government, it's become fairly fashionable. In some areas, it's even required. In the commercial sector, most sophisticated information systems professionals, the ones who do the purchasing, consider Unix to be an anathema. They just don't think of it as a viable operating system. They are very naive about what's possible in Unix. They are also probably correct in their assessment of the differences in quality and commercialization of Unix applications.

> ”
>
> *'Information systems professionals, the ones who do the purchasing, . . . are very naive about what's possible in Unix.'*

Some leading-edge corporations are experimenting with Unix in two ways. First, they are using a Unix pilot system with the office system consulting group. Second, if a department has a data base requirement, one candidate is Unix. They're not choosing Unix, though. They are choosing a data base that happens to run on Unix.

How is Unix's ability to connect with DOS-based micros contributing to its acceptance in the office?

Unix is most likely to make a difference as an upgrade path to DOS. Users start with a PC and then find that they have a multiuser requirement. That requirement is usually satisfied by networking PCs in a DOS environment or by connecting PCs to a proprietary minicomputer system. A third alternative is to network PCs in a Unix environment. Users find themselves increasingly using Unix software to run the network or to provide a multiuser application for the network server. They are backing into Unix without realizing it.

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CIRCLE READER SERVICE NUMBER 273

UNIX VIEWPOINT

Readiness Is All: IBM Holds Defensive Stance In Unix Arena

BLUE BEAT

Dale Kutnick

IBM's Unix strategy is an offeosively defensive posture currently driven by requirements of niche markets (education) and specialized/vertical markets (military, scientific/engineering and the government). Indeed, some of these areas demand Unix support because users believe that a "standard" operating system increases flexibility. But more importantly, IBM has entered these segments and will support Unix because these areas are multibillion-dollar markets and offer the opportunity to exercise new technology.

Unix's potential significance in the commercial distributed/departmental systems market — primarily as a personal computer server — forces even the likes of IBM to establish a beachhead in the Unix camp. This position enables IBM to monitor market conditions closely. And it is likely that opportunities will arise as Microsoft Corp. hybridizes future iterations of its MS-DOS with Unix (to attack the local-area network server market) on Intel Corp. 80386 and Motorola, Inc. 68020 processors.

IBM will undoubtedly participate in this market and may even use its own Unix-derived AIX operating system used on the RT Personal Computer.

Strategy grounded in economics

IBM's Unix strategy is firmly grounded in economics. If a substantial Unix market develops, IBM must be positioned not only to take full advantage of it, but to assume a leadership role as a means of maintaining account control. IBM can afford to lose a few operating system installations far more readily than it can afford to yield account control and its incumbent growth potential.

This position is similar to the one Digital Equipment Corp. has taken with Unix — quiet support. More importantly, both IBM and DEC offer proprietary implementations of Unix (AIX and IX/370 from IBM; Ultrix from DEC). This approach will enable the two firms to establish their own Unix environments that diminish the importance of Unix's alleged portability and hardware independence. But then, most Unix vendors offer a customized version — under the altruistic guise of fixing various deficiencies.

Clearly, hardware independence is not in the interest of DEC, IBM or most other established vendors. Nonetheless, these vendors will support the basic AT&T Unix System V and enhancements and/or University of California at Berkeley Unix Version 4.2 kernels. Typically, an independent software vendor requires one to three months to port Unix to a system with proprietary hooks.

The basic application remains constant, but the user interface and internal processing may change. Thus, IBM's proprietary Unix offerings enable it to compete in those markets where Unix is required, while still maintaining some measure of control. IBM is in a position to react quickly to Unix development and/or to drive de facto standards with its implementations. This is especially true on the RT PC, which could develop into a significant scientific/engineering workstation offering. I expect IBM to enhance the RT PC significantly in the next two years. Performance will more than double in the next year, and price/performance will become more competitive with the 68020-based machines.

Undoubtedly, IBM needs a product to compete with DEC's Microvax and workstations from Sun Microsystems, Inc. and Apollo Computer, Inc. among others. The battle will take many forms, not the least of which will be proprietary micros (a la Microvax and RT PC) vs. off-the-shelf micros (68020 and 80386 based).

Nonetheless, IBM does not actively market Unix nor is it likely to do so soon. IBM is clearly positioning its VM operating environment against Unix in the departmental and scientific/engineering processor market. IBM has recently enhanced VM packaging, pricing and usability — specifically to compete in the commercial departmental market with low-end 4300s. Unix support on these hardware platforms will be tenuous at best unless significant applications programs and utilities become available and user demand increases. In the scientific/engineering world, IBM has enhanced VM technical performance by one and a half to two times on 4300-type processors. IBM emphasizes VM's ease of use and wide range of programs and mainstream IBM connectivity against Unix.

To this end, IBM has yet to deliver IX/370 (other than early support sites); it has instead bid Amdahl Corp.'s UTS in the few cases where Unix is required in a 370 environment. The RT has underwhelmed the market (less than 5,000 shipped) despite its potential. The lack of Unix applications has been an issue.

But IBM (and DEC) will continue to support Unix with proprietary environments as long as possible. Most large users will eventually employ Unix, and IBM will clearly want a hand in it.

Kutnick is executive vice-president of research at the Gartner Group, Inc., headquartered in Stamford, Conn.

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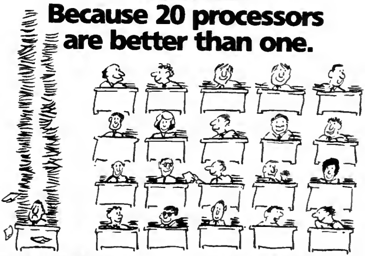

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CIRCLE READER SERVICE NUMBER 274

Technical Stargazing: DP Managers Must Forecast The Future

MANAGER'S CORNER

Jim Young

The data processing manager has never had a simple job. Today he must be a diplomat and adviser to top management; teacher, policeman and troubleshooter for users; and accountant and negotiator with vendors. To the DP department, he must be a motivator, confessor, organizer and delegator. And now he has an added role — forecaster.

The DP manager must anticipate the future of today's technology and react accordingly. Hardware and software decisions must satisfy immediate functional criteria but must be made with an eye on the future, particularly relating to obsolescence. Late purchasers of IBM's Displaywriters understand the dangers of not predicting the future. It is important to stay compatible with new peripherals, software and networks, even for stable products.

Those who have been following Unix could have predicted its importance based on AT&T's emphasis. Couple this hunch with an extrapolation of personal computer power and the need for increases in throughput, and it is clear why the microprocessor's role is changing from that of a single-user workstation to that of a multiuser, multitasking device used in group system situations. History seems to be validating this; whether the operating system turns out to be Unix, Microsoft Corp. Xenix, Pick Systems Pick or even some descendant, its fundamental direction was suggested by projecting emerging capabilities into the future.

The value of knowing the direction technology will take is obvious for vendor design engineers, computer scientists and software houses. After all, products and services not only have to meet user needs but must also include the productivity and compatibility advantages of new technology. However, for the DP manager, technical prognostication is more than an academic exercise. It will permit strategic positioning of information resources to capitalize on expected product capabilities. Forecasting may guide a choice between alternatives or even encourage a strategic postponement of immediate action.

Heed stormy forecasts

A good forecast can also provide a warning. Optical storage technology, despite the ballyhoo from some vendors, did not distract the majority of DP managers from continuing to invest in magnetic storage. In this case, understanding the science behind an emerging technology was critical in assessing its significance.

Since such foresight can lead to either victory or defeat, it may be instructive to note how others try to anticipate future trends without having to resort to psychic powers. One way is to evaluate the science itself. Years ago laymen got excited about using satellite communications in DP networks without accounting for the significant delays in getting a signal to travel over distances. A good forecast would have made allowances for this.

Another factor to consider is how close a technology is to being commercial. No one disputes the advantages of the gallium arsenide chip. However, the ability to produce it reliably and cheaply still remains an obstacle. Moreover, once this barrier is overcome, will the chip render existing systems obsolete, or will it just provide a new performance plateau for the migration of these systems? As a DP manager, it pays to know which technical changes can affect you directly and which will only have a remote impact.

It is also important to recognize which technologies will be adopted and which will not. The best barometer of product acceptance is the herd instinct of the industry. This instinct accounts for the fascination with vendor product direction in the industry press. In the diskette war, for example, 8-in. diskettes have clearly become passe, while the battle is hot and heavy between 5½-in. vs. 3¼-in. diskettes. Will one size prevail, or will we have to contend with multiple types? The answer may not be much of an issue for installed PCs, but may make a difference in future purchasing decisions.

The adoption of technical standards (such as RS-232) can be another augur of things to come. With standards, of course, there is always the question of timing and interpretation, not to mention the typical battles that prevent agreement in the first place. However, these maneuverings are useful to watch as a means to categorize possible scenarios.

Corporate scorekeeping is another important indicator. The failure of a company can cause its technologies to collapse, taking users with it. And even industry giants are not immune: Remember 96-column cards?

And as the perpetual competitive struggle for technical leadership unfolds, the DP manager must assess the future and navigate safely around treacherous waters to safe harbors.

Young is principal and the director of consulting for Authur Young & Co., Worcester, Mass. He has worked in the industry for 15 years.

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CIRCLE READER SERVICE NUMBER 275

Unix Hoopla Based On System's Symbolic Implications

ISSUES AND ANSWERS

Robert D. Gilges

Unix is one of those rare computer systems that is both a product and a symbol. Unix, the product, is encountered relatively infrequently in organizations. But Unix, the symbol, has a substantial history and continues to be the subject of considerable press attention.

A review of the trade press reveals that Unix has become the center of a software market, albeit a modest one. In 1986, there has been some coverage of new Unix-oriented application development facilities — a computer-integrated manufacturing system and a text processor. And anyone who does much software evaluation will probably say that applications oriented toward Unix (or Microsoft Corp.'s Xenix) are available to support any number of business processes.

In addition, the Unix market is described as ripe for rapid future growth. For example, some observers have suggested that the time is right to develop interactive office systems to be run under Unix. It is also reported that vendors are enhancing and adapting Unix to large-scale, on-line transaction processing.

Clearly, Unix and its associated application software markets have grown in the last few years. Nevertheless, by reading commentary about Unix from the time of the first AT&T computer hardware announcements, it is necessary to conclude that Unix has not had the kind of impact many observers expected. Certainly, it has not become a de facto operating system standard, nor has it provided AT&T with anything approaching market dominance. Yet both these results were expected to follow the commercial introduction and subsequent marketing of Unix.

Given the relatively low level of Unix market penetration, why does it continue to generate press and reader interest?

One basic factor is AT&T's support for the product. Unix is an important aspect of AT&T's computing strategy. At a winter 1986 Unix users group meeting, AT&T again claimed that its System V was positioned to be the universal standard for all computer-size classes.

Unix groupies

Also, Unix is a good product, with an influential following. Don't forget that for more than 10 years many computer science graduates have been trained in Unix environments. These professionals are more aware than most business systems people that Unix was far ahead of its time and that its more advanced concepts and functions were widely copied in later operating systems' designs. There is, in short, a sort of Unix sociology that contributes to its viability, especially in the fields of systems, systems utilities and scientific and engineering software development that attract fine programmers.

For most business computer users, Unix is not so much a leading product as it is a symbol. Unix — at least in its marketing and sales promotion — appeals to those who hold the view that improved connectivity, networking and software portability will make companies more productive and profitable. Unix's lack of quick success in the market points to what we all know: Achieving these benefits is not easy and calls for superior systems planning, fine project management and expenditure of considerable time.

That Unix is difficult for first-time users — not user-friendly — further emphasizes how difficult it is to achieve the kind of information resources management that modern businesses require to compete and win in today's economy.

Unix also symbolizes the fact that even advanced technology cumulates. Computerization and innovation are almost synonymous. Nevertheless, large IBM mainframe installations have big stakes in their existing operating systems and related business application portfolios. Despite Unix's perceived strengths, they simply have not been great enough to change the software market quickly.

The widespread incorporation of the advanced features of Unix into other operating systems also constitutes a marketing challenge. After all, greater availability of desirable features means that Unix is less unique and reduces incentives to use the system.

The irony is that AT&T was not in the computer business in the days when it could have made the most of Unix's advanced features. Information products succeed because a variety of factors — desirable technical features, solid financing and superior marketing/sales promotion — coincide at the right moment. The Unix case illustrates both the delicacy and importance of this coincidence.

Unix will continue to have a secure market niche and gain user acceptance, but it will also continue to be a reminder of the challenges awaiting both systems integrators and those who market advanced technology.

Gilges is partner in charge, Information Systems Services Consulting Practice, at Peat, Marwick, Mitchell & Co. in New York. This article was written in conjunction with Richard A. Willner, a manager in the practice.

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3317-0586

UNIX NEWS

Unix Providing Solutions For Users At All Levels

Action in the Unix arena has not been exactly fast and furious of late. But there have been some goings-on that bear watching.

Consensus has it that mainframe Unix is not a large market. In 1985, Amdahl Corp. of Sunnyvale, Calif., sold 55 mainframe Unix licenses while IBM sold 40, according to International Data Corp., a Framingham, Mass.-based market research firm. Except for some test sites, all of these Unix installations have been running under IBM VM.

Volume market demand is clearly not the impetus for mainframe Unix. Instead, the motivation appears to be the emergence of an all-or-nothing demand for mainframe Unix in two areas — the federal government and the scientific/engineering sector.

UNIX UPDATE

The federal government is now requiring Unix in its purchase order requests, including the ones for mainframes. Also, engineering/scientific users are beginning to upgrade from their Unix minis to mainframes.

One reason for this move is speed. "Jobs that take an hour on a mini take five or six minutes on a mainframe," said Andy Schroter, manager of systems programming for the AT&T Data Processing and Corporate Telecommunications Group in Piscataway, N.J.

Another reason is support. "It takes less people to support one mainframe with one operating system and one set of applications than it does to support several minis, each with its own software," Schroter explained.

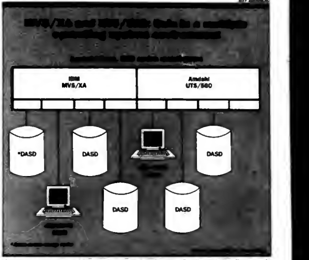
Schroter, who maintains mainframes for AT&T's internal operations, is one of the earliest users of UTS/580, the native Unix operating system that Amdahl publicly introduced in February. For two years before the announcement, he ran one of 40 native UTS test sites, most of which were in AT&T.

When Schroter first ran native UTS, he had certain concerns. "We got a vanilla Unix and [IBM] 3270 emulation," he said of the first version. "We had to educate Amdahl that Unix on a mainframe has to be a commercial product."

Schroter gives UTS a "B+/A-," but he still sees room for improvement. "UTS native is viable, but it's not as sophisticated as VM or [IBM] MVS," he explained. "But I don't think it will be too long before the tools are available."

One capability that is making UTS/580 more attractive is Amdahl's Multiple Domain Facility (MDF), which allows several operating systems to run concurrently (see chart this page). "MDF saved us a few million dollars," Schroter said. Instead of buying a Unix minicomputer, he explained, AT&T has used MDF to add Unix to an existing mainframe running VM.

Amdahl is now getting orders for UTS/580 outside of AT&T, several months after its debut. The firm has shipped two copies of UTS/580 with two Amdahl 580 series processors to Lawrence Livermore Laboratory in California, Amdahl officials said. And the National Aeronautics and Space Administration Ames Research Center in Mountain View, Calif., has ordered UTS/580 for its two Amdahl 5840 mainframes.



Some users plan to utilize Amdahl's Multiple Domain Facility, which allows multiple operating systems to be used concurrently, to run UTS/580 as well as a proprietary operating system from IBM.

■

For months, people speculated about the impact of IBM's Unix-based, reduced instructions set computing architecture microcomputer on the technical workstation market. In February, when IBM introduced the RT Personal Computer, some suggested that it might be a multiuser office system as well. Others wondered if it was an engineering workstation at all.

Micro Focus, Inc., a UK-based software supplier, is one of the latest companies to hail the RT PC as a business system. In announcing its plans to make four Cobol packages available on IBM's workstation, Micro Focus stated that business users are demanding business applications for IBM's RT PC. The reasons for this demand seem to lie in IBM's design and pricing of the system and in the applications it has chosen to support.

In a report for International Data Corp., a Framingham, Mass.-based market research firm, D. E. Followwill noted that IBM has designed the RT PC to support up to eight concurrent users while most workstations only support one or two. He also pointed out that the RT PC is not even competitively priced with similar products. For example, he said, a standard RT PC costs just more than $30,000, about $10,000 more than a Sun-3 workstation from Sun Microsystems, Inc.

The software available for the RT PC also hints that it is well if not better suited as a departmental office system. AIX, IBM's version of Unix for the RT PC, uses front-end menus to hide the nontechnical user from cryptic Unix commands, Followwill observed. He also noted that IBM's support of the full graphics software line from Visual Engineering, Inc., based in San Jose, Calif., gives the RT PC both engineering and business graphics capabilities.

Other applications that the IBM workstation supports are clearly designed for office users. Alis, from Westboro-based Applix, Inc., is an office automation package that provides word processing, spreadsheet, electronic mail and basic text publishing capabilities. Samna-Plus, from Samna Corp., located in Atlanta, is a WP package.

IBM's unofficial marketing of the RT PC is not hurting its reputation as a good business system either. According to a spokesman at Applix, IBM sales representatives are peddling the workstation to the market they know best — office automation.

■

"Unix to DOS" is a trendy catchphrase among Unix vendors and potential Unix customers, and several hardware and software companies are making products and deals about which they hope people will talk.

Sun Microsystems, Inc., has joined IBM and Apollo Computer, Inc. in promising to offer a Personal Computer AT-compatible coprocessor board for its workstations that allows Microsoft Corp. MS-DOS applications to run under Unix.

Sun is late in announcing its board, with shipment scheduled for the third quarter of this year. Apollo and IBM announced their boards in February, but they are not expected to make them available until later this year.

Sun also introduced PC-NFS, software that allows microcomputer users to have transparent access to files on any computer that runs Sun's Network File System. PC-NFS is available within 30 days of order.

Locus Computing Corp. of Santa Monica, Calif., and Microport Systems of Scotts Valley, Calif., announced that they will integrate Locus' Multisystem Merge interface, which allows Unix and DOS to run concurrently, with System V/AT, Microport's version of AT&T's Unix System V for Intel Corp. architectures.

What's In Store For Xenix?

Sometimes it's hard to understand where Bellevue, Wash.-based Microsoft Corp. is headed with Xenix, the company's Unix derivative for IBM Personal Computers and compatibles, especially in light of the company's apparent goal to make its MS-DOS operating system more like Unix to take advantage of the extra power of the Intel Corp. 80286 and 80386 microprocessors.

"Xenix is used for multiuser computing but so will MS-DOS 5.0," explained Bonnie Digrius, director of software market research at Input, Mountain View, Calif. "MS-DOS 5.0 is also supposed to be a true networking product, which will include windowing and multitasking features. I don't know where that's going to leave Xenix. It wouldn't be in Microsoft's best interests to produce an MS-DOS product that would carry all the attributes of Unix and take market share away from Xenix."

There are other factors veiling the future of Xenix. IBM started shipping its AT&T System V-compatible version of Xenix in March of 1986, and Microsoft is preparing a new version of Xenix that will be fully compatible with System V, expected out by the end of the year.

IBM's System V version of Xenix takes advantage of the protected mode of the 80286 microprocessor for multiuser and multitasking operations as well as for extended memory capabilities. To prep the market, Microsoft has been shipping the System V developer's kit to manufacturers.

Confused? So are the analysts. While Bill Gates, chairman of Microsoft, has gone out of his way to make statements that the company will continue to support Xenix well into the future, some industry observers are skeptical. Tim Bajarin, a vice-president at Creative Strategies Research International, Inc., San Jose, Calif., maintained that Xenix is a bridge product that has almost served its purpose and that Microsoft will soon discard it, replacing it with the more Unix-like MS-DOS releases.

Digrius disagrees. "MS-DOS and Xenix will coexist on the same processor, the 386," she said. "What this will do is take a big share of the growing market for MS-DOS/Unix software links. The pairing of MS-DOS and Xenix on the same machine is much more efficient than the kinds of links current software and hardware provides. I think that's part of Microsoft's strategy. They won't abandon the Xenix market. It's too profitable."

According to International Data Corp., a Framingham, Mass.-based research firm, the total 1985 Xenix market in low-end, multiuser systems amounted to about $650 million.

Unix Supermicro Vendors Headed For Tough Times

Vendors of Unix-based supermicrocomputers might be in for a hard time in the departmental computing arena.

IBM has taken aim at grabbing a larger share of departmental computing by bolstering its line of System/36 and 38 minicomputers, and Digital Equipment Corp.'s departmental computing sales have been flying in the past year. The problems for supermicro vendors might be just beginning, however.

"IBM now has a clear strategy in departmental computing," according to Kimball Brown, industry analyst at Dataquest, Inc., a San Jose, Calif., market research company. "That strategy centers on the IBM Personal Computer AT."

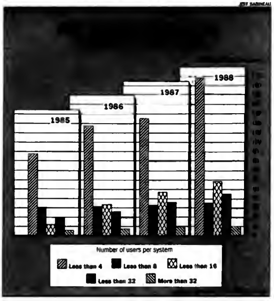
Brown claimed that the PC AT has been far from fully utilized by IBM. "What you're going to see is a three-tiered departmental environment. At the low end will be ATs used as Unix workstations and file servers, connected to 32-bit Unix machines in the middle and further linked to an [IBM] 370-like mainframe environment. IBM is working on putting a 370 on a chip, and this will tie into its departmental strategy."

Effect on vendors

How will this affect supermicrocomputer vendors? A great deal, Brown said, because the Unix machines in the middle will increasingly be ATs and Intel Corp. 80386-based microcomputers running expanded Microsoft Corp. MS-DOS and Xenix and AT&T Unix System V operating systems.

"You can see everything coming together in a few years," Brown explained. "First of all, I don't think the System/36 and 38 are going to figure in departmental computing. The real battle will be between the IBM RT PC and 386-based machines.

"Let me set it up. The departmental operating system of choice will remain Unix. The RT PC runs Unix and so will the 386 machines. The RT PC could become an important file server for the engineering environment anxious to tap into commercial data bases, and the 386 machines will be supermicro departmental computers in the commercial area, meeting all the requirements of a departmental computer: 32-bit processor, acting as file server and serving a homogeneous community of users and applications."



JEFF SABINEAU

There are other aces up IBM's sleeve that will put the squeeze on Unix supermicro vendors, Brown said. The first is DB2, IBM's relational data base application environment that Brown said will be migrated to the AT level and serve as an important application environment for departmental software. Next is IBM's commitment to providing better communications among its systems through the LU 6.2 protocol, which will give easier communications links across IBM and Unix systems. This last was a lesson learned from DEC, Brown said, which is closing more sales with its ability to provide tight communications across systems architectures.

"LU 6.2 will be fully implemented next year, and MS-DOS 6.0 for the 386 processor, [which is] being worked on by Microsoft, will be out next year. But 1988 will be the big year everything comes together for departmental computing. That's when users will really start buying."

Until then, Dataquest sees departmental computing growing slowly, only 4.8% in 1986, for work group systems of two to 10 users, from a total market of $3.4 billion in 1985; and only 6.4% in 1986 for departmental systems of 10 to 20 users, from a 1985 figure of $2.9 billion.

International Data Corp., Framingham, Mass., put the worldwide supermicro market at $1 billion for 1985.

'So much promising stuff'

"You can't blame users for waiting to buy," Brown maintained, "there's so much promising stuff coming to the market in the next few years."

Where does that leave vendors of Unix-based supermicros? "Supplying connectivity to [IBM's] Systems Network Architecture, LU 6.2, DB2, PC ATs and 386-based machines," Brown said. "Unix will have to be incorporated into all of these to maintain its position of the operating system of choice in the departmental area. IBM wants this market, and IBM will be supporting Unix, but supermicro vendors — all vendors of Unix systems in fact — will have to plug into the IBM world to survive. I think [Altos Computer Systems, Inc.] has the right idea. They just expanded their 286-based multiprocessor line. That's the way the market is going."

John Mitchell, president of Motorola, Inc., whose Cupertino, Calif., subsidiary, Motorola Computer Systems, Inc., recently introduced its 8000 series of Unix departmental computers, countered that users are frustrated by proprietary computer systems that lock them into single vendors, even if that vendor happens to be IBM.

There will always be room for alternatives, Mitchell said.

Interest Of Corporate User Still Eludes AT&T System V.3

AT&T's introduction of Unix System V.3 was a big announcement. It was a big announcement that met with apathy from most corporate users.

Having postponed System V.3's introduction by four months and having flooded the press with leaks about its features, AT&T successfully eroded most of the industry's interest in the new release.

Among the DP sector of the industry, interest wasn't high to begin with. Despite AT&T's positioning of System V.3 as a "watershed in the commercial life of Unix System V," the focal point of the enhancements was the system's advanced support for network applications. Data processing managers have begun talking about networked environments, but few have Unix systems in their computing environments.

Commercial quality in question

Corporate DP managers are still concerned about Unix's ability to support commercial applications. System V.3 does not address this concern, according to Omri Serlin, who heads Itom International Co., a Los Altos, Calif.-based market research and consulting firm. "AT&T has not yet done support for data management," he explained, "so Unix is still not strong in any specific commercial sense."

AT&T's emphasis on the commercial importance of the System V.3 enhancements is not misdirected, though. Analysts agree that Unix will increasingly enter corporate departments as a part of a personal computer networking solution. The users on these networks will want to share information, but they will not want to know where on the network it is located. In System V.3, AT&T has provided two key features that will allow users to share resources along the network transparently: Streams and Remote File Sharing (RFS).

Streams is a mechanism that separates an applications interface from any network protocols. It consists of several modules, including the Transport Provider Interface, Transport Level Interface (TLI) and TLI library. These modules perform network services by isolating hardware dependencies. These features of Streams will serve as a base for the development of distributed processing applications that run independent of the underlying network.

AT&T's RFS software is partially based on Streams' TLI, making it independent of any network medium or protocol. RFS allows users to share resources transparently across a network because it treats all files and devices on the network as local files. To assure data integrity across the network, RFS provides file locking to prevent concurrent access by two or more systems and security features that enable a local system to accept or deny access to local resources by a remote system or user.

RFS vs. NFS

By incorporating Streams and RFS into System V.3, AT&T is attempting to set up RFS as an industry networking protocol standard. As such, RFS comes up directly against Sun Microsystems, Inc.'s Network File System (NFS). For many people, the question of which standard will win out has already been answered, but not everyone has the same answer.

NFS proponents point out that Sun has had a two-year lead in promoting its networking protocol. In fact, more than 60 manufacturers and universities have licensed Sun's NFS for their computer systems. RFS supporters point to the power of AT&T's backing.

One decision factor for users that Serlin sees is whether they need a network-wide file system for a heterogeneous or Unix-only environment. "RFS, as AT&T has postulated, is strictly Unix," Serlin explained. "NFS is not necessarily limited to Unix." Beyond this factor, there appears to be little else that will propel a user to one system or the other.

Unix vendors and analysts generally agree that NFS and RFS are very similar in design, and the functional strengths and weaknesses of each system seem to cancel each other out. NFS does not provide a mechanism for file locking; RFS does. RFS requires a single machine to manage the names in the network. If this "name server" machine fails, Serlin said, the entire network goes down. NFS does not require a name server.

"Depending on how you look at it," Serlin concluded, "NFS and RFS are equally acceptable or unacceptable. Each needs to be modified to be completely acceptable."

Unix Finds Its Place In The Governmental Arena

Operating System's Portability Touted

Since the U.S. Congress decreed some years ago that federal government agencies must open up bidding on government computer contracts, Unix business has picked up considerably.

Let's back up a little. Unix has always found a spot in the U.S. government, mainly through sales by Digital Equipment Corp., which offered its version of the Unix operating system on its PDP-11 and Decsystem-10 minicomputers. There was a problem, however.

"Three years ago," explained Robert Borochoff, research computer scientist in the Federal Judicial Center, Washington, D.C., "Unix was a chancy proposition for us. Although Unix was portable and hardware independent, there were still few hardware vendors running Unix, and we considered it a rather restrictive computer environment. DEC was also not going to put in another generation of Decsystem-10s, and we needed more computing power."

A number of things happened in the meantime, however, to make Unix more attractive to government agencies. The first was a ruling by Congress, which indirectly said that government agencies would have to include Unix systems vendors in future requests for proposals. This ruling is regulated and implemented by the Office of Management and Budget, the controller of government purse strings, and the General Services Administration (GSA), the procurement arm of the federal government.

'Unix has stabilized'

This alone did not help the Unix cause in government, Borochoff said, because Unix was still viewed as a liability, with little software and few big-name supporters. In three years, however, the situation has changed. "Unix has stabilized and received more support from hardware vendors," Borochoff said.

The case of Borochoff's Federal Judicial Center is not unique in government computing. The center designs and develops applications for use in the 300 appellate, bankruptcy and various other courts located across the country. Borochoff said that the center is standardizing on Unix and will only consider those hardware vendors offering systems running it.

The center has drifted away from DEC systems because Borochoff said Ultrix, DEC's Unix operating system version, was closer to the University of California at Berkeley's standard than AT&T's System V, which the center and more government agencies have adopted.

The center is using Unix-based supermicros from Plexus Computers, Inc. and Pyramid Technology Corp. and workstations from Sun Microsystems, Inc. and AT&T to develop in-house applications.

Borochoff said that Unix portability across hardware systems and the growing support from Unix vendors has allowed Unix to make inroads into more federal government agencies.

"AT&T has always been able to sell their services to the government, even before divestiture, but now they are much more competitive," he said, citing AT&T's contract with the National Security Agency worth nearly $1 billion and other contracts with the U.S. Department of the Treasury and the U.S. Drug Administration. IBM has also jumped in by supplying 24,000 IBM Personal Computer ATs running Microsoft Corp.'s Xenix to the Internal Revenue Service.

DEC, traditionally one of the big computer suppliers to the federal government, has been stung lately by the government's growing preference for AT&T's System V Unix standard.

"DEC has had real problems with how to handle Unix," Borochoff said. "However, the fact that Berkeley Unix and System V Unix are coming closer together is going to be a big plus for DEC in overcoming some complaints of incompatibility between Ultrix and System V."

Borochoff makes it clear, however, that the designation of the Unix operating system as a competitive factor in government computer purchases is not a fiat from above. "We are not under direct pressure to include Unix in all requests for proposals," he said.

However, since the Federal Judicial Center and other government agencies have to go through the GSA to purchase computer systems, one industry analyst said there is indeed economic pressure from the GSA for agencies to conform to the new emphasis on competitive bids, which means making sure Unix-based systems are in the running. Such pressure to conform can only be a boost for Unix for the future.

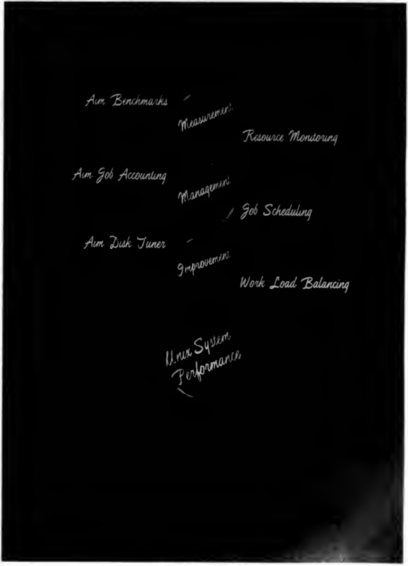
CORRECTIONS

The Institute of Management Sciences was incorrectly written [*CW Focus*, July 9, page 34].

SAS Institute, Inc. owns the System 2000 data base management system [*CW Focus*, July 9, page 73].

George Rittersbach's name was not spelled correctly [*CW Focus*, July 9, page 12].

Mike Brody, an analyst with the Stamford, Conn.-based Gartner Group, Inc., was not fully identified [*CW Focus*, July 9, page 19].



CIRCLE READER SERVICE NUMBER 265

IBM & DEC Take Up The Unix Challenge

• BY • JEAN • YATES •

IBM and Digital Equipment Corp. offer a wide range of Unix-based hardware, software and services. Why have the two largest computer companies invested substantial money and resources in full Unix product lines? Why are the smaller computer manufacturers continuing to develop new products, including next-generation, 32-bit systems, around the Unix standard? The answers can be found by analyzing the Unix strategies of IBM and DEC and projecting the future Unix activities of small and larger vendors.

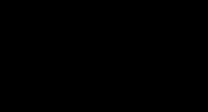
DEC's software strategy is to provide a solid foundation of tools and utilities designed to utilize DEC hardware effectively. The cornerstone of this strategy is VMS, the firm's major strategic software product. The Unix operating system is offered only when a specific client or market segment absolutely insists upon it. DEC sales representatives do not actively market the operating system outside specific Unix-oriented markets, and the Digital sales force has little knowledge of their firm's Unix offerings or how to sell them.

The common reaction of a DEC salesman, faced with a customer who asks about Unix, is to steer him toward VMS and away from Unix with stories of its research orientation and lack of business features. However, in response to certain specific strategic market demands, DEC has pushed its Unix strategy, promoting it to those accounts that DEC would otherwise lose.

Why has DEC gone to the expense of providing a Unix product when its sales organization is not trained to sell it but to head potential Unix customers to VMS?

The answer has two parts: First, DEC wishes to maintain strategic position in key markets, and second, the amount of money being spent on Unix systems cannot be ignored, particularly while the computer industry is in an economic down period.

DEC's resource commitment to Unix is clearly a response to the encroachment of Unix-based systems into DEC's traditional stronghold markets. The two strongest sales opportunities for Unix-based minicomputer systems are in the federal government and in the general engineering scientific markets, both dominated by DEC. The federal government has been active in procuring very large Unix-based systems: Witness the $1 billion deal between AT&T and the National Security Agency; the 24,000-unit sale of IBM Personal Computer ATs running Microsoft Corp. Xenix by IBM to the



Internal Revenue Service; and the Sperry Corp./U.S. Air Force sale, valued in excess of $100 million.

DEC cannot ignore this activity on its turf. Estimates by International Data Corp. (IDC), a market research firm based in Framingham, Mass., state that more than 40% of all federal mid-range systems purchases in 1986 will require a Unix operating system option. DEC cannot turn its back on such a large piece of the federal computer business.

Nor can DEC overlook the the dollar value of the Unix market. IDC said the overall sales of Unix-related hardware, software and services will exceed $4.2 billion in 1986, with a good portion of those sales in markets of keen interest to DEC.

Sales of Unix-based equipment are also especially strong in the automotive and aerospace industries. General Motors Corp.'s Manufacturing Automation Protocol standard for process control and factory automation uses Unix as its development environment. GM requires Unix on its workstations, which has influenced other manufacturers that had not previously considered Unix as an engineering operating system for its research and development requirements to take it seriously.

DEC recognizes the importance of specific markets with a strong interest in Unix and, in response to demand and market opportunity, offers a fully supported and integrated Unix product line. As its main Unix thrust, DEC provides Ultrix, a version of Unix encompassing the University of California at Berkeley Unix 4.2 with support for Unix System V.2. Ultrix is a member of the Digital Computing Environment, a set of operating systems and tools that makes up the backbone of DEC's software strategy. DEC fully supports Ultrix, which exchanges files and mail using Ethernet and Decnet with VMS and other DEC operating systems.

DEC's future plans for Unix

DEC has steadily expanded its resource commitment to Unix during the last few years. However, Unix is not a part of DEC's overall strategic plan to provide information systems that work the way people work and interconnect to share resources. That plan is tied to VMS and DEC's proprietary products.

DEC will not, in IDC's opinion, sell Unix anywhere it can sell VMS instead. For that reason, IDC does not expect DEC to offer Unix-based small business or general Fortune 500 data processing solutions. The firm will continue to provide its proprietary solutions in competition with Unix.

A particularly strong selling point against Unix has been DEC's All-In-1 integrated office system on VMS. DEC has the largest installed base of integrated office systems, and All-In-1 has an installed base of 3,600 units on DEC minicomputer networks, according to IDC.

The principal strength of All-In-1 derives from DEC's unified systems architecture. Its word processing is at about industry norm; while its electronic mail and filing system are less functional than those of competitors. However, Unix offers no equivalent in a cohesive user interface. Tying together a variety of different Unix applications programs into one system continues to require a set of crib sheets, manuals and knowledge of Unix command esoterica that turns off commercial users.

On the Big Blue front, IBM maintains a Unix strategy very similar to DEC's. IBM offers a range of Unix products, both stand-alone and running IBM proprietary operating systems such as VM. IBM does not actively market its Unix products, and its sales force, in general, does not understand Unix.

However, the IBM Federal Marketing Group is very involved in bidding for Unix-related procurements, and the recent IRS purchase of more than 20,000 Xenix-based PC ATs indicates that IBM is having some success at selling Unix-based systems.

IBM's real target for its Unix effort is in the high-end minicomputer area. The majority of IBM Unix development resources are related to the IX/370 operating system product. The Unix port, based on System V with some Berkeley enhancements, runs over VM, with VM handling system administration and communications functions.

Unix users have responded with mixed reactions to the IX/370 concept. Many feel that the VM overhead is costly, degrades performance and requires VM-trained systems administrators. Until recently, an IBM Series/1 as well as a 4300 system was required to run Unix, adding to the cost. IBM has responded to these criticisms with the offer of very high-performance and competitive prices — but only in situations where IBM really wants the business.

IBM, like DEC, views Unix system sales as important only where they involve business that would otherwise go to another vendor. In addition, that business has to be large in dollar value and strategically important to warrant the use of IBM resources for non-IBM software sales. However, Unix is IBM's only non-IBM-developed operating system to be treated as a "Level One," fully supported "Program Product." This expenditure by IBM indicates that it is serious about getting Unix system sales, mainly at DEC's expense.

Particularly in the government arena, IBM can use Unix as an inroad into DEC VMS-dominated accounts. In federal government sales, an IBM VM vs. DEC VMS battle has often resulted in a DEC win. But an IBM Unix vs. DEC Unix sales situation makes things even on the software side and eliminates DEC's VMS advantage.

The IBM RT PC, introduced in spring of 1986, is IBM's Unix-based workstation

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product. Although competitively priced, IBM's software offerings and overall knowledge of particular requirements of Unix users does not equal that of its major competitors — DEC, Apollo Computer, Inc., Sun Microsystems, Inc. and Hewlett Packard Co.

A product without a home

The RT PC seems to be a product without a home and was rumored to have been moved from group to group within IBM before release. IDC views the RT PC as another IBM Unix product released to meet particular user requirements in government procurements and to try to tap the now $1 billion-plus Unix engineering workstation market. For the time being, IBM's commitment to the RT PC seems in line with its overall Unix strategy — offer it where it is required to make the sale, but otherwise sell IBM proprietary products.

IBM's recent experiences with the clone makers in the low-end PC market is probably going to affect its Unix philosophy as well. The RT PC with the open architecture Unix operating system is already susceptible to lower cost, higher function products from Sun and Apollo, and IBM may decide that the investment of resources is too great to build up a market only to lose it to inexpensive knockoffs.

Unix products at the high end of the computer market will not be as affected by clones because of the amount of proprietary and technical service and support that is required. Expect IBM to remain active at the high end of the Unix market when it needs to sell Unix to protect or gain a key account. Expect IBM to soft-pedal Unix at the low end, both because of its late entrance into the Unix workstation business and because of the hard knocks it has taken in the commodity PC market.

Only IBM, DEC and a few other computer manufacturers worldwide can afford to develop and maintain an integrated system of micro-to-mainframe computers.

The 150-plus connectivity-oriented products introduced by IBM this spring showed users and vendors alike the massive monetary resources required to pull together a cohesive desktop-to-mainframe network. Few other computer vendors have the money to develop solutions that will allow their computers to connect as a proprietary solution. Few computer vendors can even afford to develop proprietary connections from their existing equipment to IBM standards. Many of those smaller vendors' only alternative is the open architecture of Unix.

DEC, with a commitment to VMS, Decnet and All-In-1 as backbones of its one vendor, one integrated system strategy that stems from the early 1970s, is in the best position today to sell such an interconnect strategy and actually deliver. IBM, of course, has promised such functionality for years and is now actually delivering interconnected networks of its computers. Few other vendors can afford to develop the computer, software and interconnect products that could duplicate the IBM and DEC efforts. AT&T is a possible exception to this statement, but it has yet to live up to its potential.

An additional burden on other computer manufacturers is their users' requirements for interconnections to IBM and DEC standards. How can these vendors survive users' demands for these expensive and complex solutions? Sadly, the answer in many cases is, they can't.

Smaller computer firms will increasingly specialize in niche markets, but these markets, operating in isolation from the growing world of interconnection, are shrinking. Even vertical market computer users are beginning to demand access to standard networks and interconnection to a diverse range of equipment.

So where does Unix fit in? Simply put, it may be the only affordable solution for smaller computer companies that must offer interconnections to IBM and DEC computers.

Not one of these computer companies alone could fund the number of applications, utilities, tools, networking solutions and IBM interconnection utilities that are available for Unix. Without intending to, the Unix community has created a substantial start on a multivendor interconnection solution that could be competitive to IBM and DEC's proprietary interconnection solutions. For the smaller computer vendors, Unix may prove the only affordable way to provide the number and range of interconnection and communications offerings that users require.

A substantial portion of the computer users in the 1990s will require a multivendor solution that expands beyond a two-vendor, IBM and DEC solution, although DEC is certainly hoping that it can offer as much of the non-IBM equipment required by users as possible. But for the rugged individualist users who want an NCR Corp. unit, Honeywell, Inc. system or a Fortune Systems Corp. word processing system tied into their networks, Unix may prove to be the umbrella under which they receive their interconnections to the IBM and DEC worlds.

The smaller computer manufacturers will buy standard, Unix-based utilities that interconnect their systems to IBM and DEC and will sell special features and functions to users whose major information processing backbone network is from IBM, DEC or, perhaps, AT&T.

Yates is a vice-president of the Framingham, Mass.-based research concern International Data Corp. and also runs the company's AT&T Advisory Services program. She is best known for her pioneering market research on the Unix operating system.

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CIRCLE READER SERVICE NUMBER 269

MARKET ANALYSIS

Big Blue's Product Moves Signal Plans For Unix

By Eddy Goldberg

While the Unix industry waits for IBM to endorse Unix officially and give the market the Big Blue seal of approval, IBM has steadily, though quietly, been making moves that indicate the company is very serious about its long-range involvement in Unix-based products.

Clearly the most significant Unix-related move by IBM in 1986 to date was the Jan. 21 introduction of the IBM RT Personal Computer, a Unix-based, reduced instruction set computing architecture workstation. "We've clearly positioned the RT to be the primary workstation for the technical professional," said W. Frank King, general manager of Advanced Engineering Systems in Austin, Texas, part of IBM's Industrial Systems Products independent business unit.

Another signal of IBM's interest in the future of Unix is that King, who is responsible for IBM's long-term Unix-based product strategy, recently was elected to the board of directors of the Unix /usr/group, which actively promotes Unix standards and its acceptance in the commercial marketplace. All previous requests to IBM to approve the nomination of an IBM executive to the /usr/group board in the U.S. had been declined, according to Lizabeth Reilly, executive director of /usr/group.

In his statement of purpose for running, King said, "The evolution of AT&T's Unix operating system into a viable commercial product and the development of multiple Unix-based IBM products has created a need for IBM to participate in users groups that are related to the coordination and promotion of Unix-based products."

The reason for IBM's increasing presence in the market for Unix-based products is clear: There is money to be made there. King singled out the government, engineering workstation and university markets in particular, but added, "IBM is going to sell Unix wherever that solves the customer need. It isn't going to be limited to any area. We're going to sell it wherever it solves the problem."

Another reason for IBM to be interested in the Unix market is that 44% of its business is overseas, says Brian Boyle, director of research at Novon Research Corp. in San Francisco. Boyle said the move to Unix standardization is stronger in Europe than in the U.S., and IBM is not likely to ignore opportunities to sell Unix in Europe.

IBM currently offers five Unix-based operating systems, all of which contain the Interactive Executive, or IX, label:

- PC/IX is a single-user system for the IBM PC XT.
- PC Xenix is a multiuser, multitasking version for the IBM PC AT developed for IBM by Microsoft Corp.
- Series/1 IX, for the Series/1.
- AIX, or Advanced Interactive Executive, for the IBM RT PC, is based on Interactive Systems Corp.'s IN/IX and contains all of AT&T System V.1, some features of V.2, some from University of California at Berkeley Unix plus IBM enhancements. The June flurry of product announcements included AIX Version 1.1, which supports the Transmission Control Protocol/Internet Protocol and Ethernet.
- IX/370 for its 370 architecture mainframes, also developed for IBM by Interactive Systems, which runs as a guest under VM.

"You may detect in our naming scheme an interesting pattern," King pointed out. "We do have an objective to have a common set of Unix interfaces across all of the products that support Unix." He said that all the above products are based on AT&T Unix System V except PC/IX, which is based on Unix System III.

When asked about the chance that Unix could wind up being used for communicating across the different IBM product lines running Unix versions, King replied, "What we will do with Unix over time is to incorporate the key IBM architectures to make our Unix products relate to each other in a maximum way and to make our Unix products relate to the other mainline IBM operating systems — MVS, VM and DOS — and the System/36.

"I think it's a matter of having a set of standard architectures that you put on all of the hardware platforms that we support. That's what gives you the connectivity. I don't think it's Unix per se that gives the connectivity," he explained.

Unix itself, as is now clear after years of hype, is not a panacea. It is just one more tool for MIS departments to use in solving everyday problems. "What will draw MIS to Unix is not traditional transaction or batch but new applications in the engineering and office areas," said Bernard Hill, vice-president of marketing at Interactive Systems. He said Unix is ideal for office software development or time-sharing in engineering departments.

In Fortune 1000 companies today about 20% of MIS directors express some interest in Unix, up from about 5% a year ago, Hill said. "To get [that] from the MIS side is wonderful," Hill said. However, that figure is about 80% for engineering center directors, he explained.

Hill said the importance of Unix on personal computers has been overemphasized. "Unix is more important on mainframes than micros. People tend to count the units shipped. Try looking at the dollar value," he suggested.

He said Amdahl Corp. claims it can support 200 to 300 users under UTS/580, its newest mainframe Unix. Hill pointed out that the cost per user on such a system is much lower than, for instance, tying several VAXs together.

Amdahl announced UTS/580 in January as the first native Unix operating system for 370 architecture mainframes. Donal O'Shea, software systems management director at Amdahl, is a strong proponent of UTS mainframe Unix. O'Shea, a 17-year IBM veteran before coming to Amdahl in 1982, said that in late June Amdahl shipped two UTS/580 operating systems on two Amdahl 580 mainframes to Lawrence Livermore National Laboratory, its first non-AT&T shipment of UTS/580. Amdahl has shipped about 45 native UTS versions so far, according to O'Shea.

IBM, which does not disclose its shipments, said IX/370 is currently available, but on a controlled, limited basis. However, King would say there is at least one IX/370 out in an MIS shop. However, IX/370 runs as a guest under VM, unlike UTS/580, a stand-alone mainframe Unix.

Although IBM is offering Unix-based products, there are still questions as to how it fits in with the rest of IBM's strategies. There are still many who think that IBM selling Unix-based products will be to the detriment of its proprietary operating systems, and stories abound about reluctance by IBM salesmen to offer Unix. "They have it, they know about it, but they'll tell you about it if it's the only way to save the sale," said David Coleman, an independent consultant in Palo Alto, Calif.

"It is not in IBM's benefit to push Unix," agreed Steven Milunovich, a technology analyst with First Boston Corp. in New York. "The more you open things up through Unix, the greater the likelihood that people won't buy IBM equipment."

He said that the government market and the engineering workstation market demand Unix to compete, but "even where they do use Unix, they try to differentiate it," he pointed out.

'Unix will become a generic platform'

Coleman said he sees major vendors offering their own enhanced Unix versions as one way to retain their market share while embracing Unix standards. "Unix will become a generic platform for proprietary products," he said. "All the major vendors can meet AT&T's System V Interface Definition or the IEEE 1003 standard, but they are all adding their own extensions to differentiate their Unix products," he said.

However, based on statements from IBM, its ever-increasing investment in Unix-based products and the rapidly growing government and workstation markets that demand Unix, IBM seems less reluctant with each passing day to make its Unix-based products known.

Finally, one of IBM's stated goals is to derive 50% of its revenue from software by the year 2000. Becoming a stronger player in the growing Unix market can only help. ■

Goldberg is a senior writer for Computerworld.

CAROLINE WHITE

High Time For Performance Management

· BY · ROGER · L. · McKEE ·

Unix's popularity has expanded so that today it can be found on every class of machine from personal computer to minicomputer to mainframe, with numerous companies specializing in providing Unix systems and traditional computer manufacturers offering it as an alternative to their native operating systems.

More than 300 Unix users in government, aerospace, industry and education were recently interviewed by Palo Alto, Calif.-based Aim Technology, Inc., a supplier of Unix system software, to determine what system software capabilities Unix still needs (see chart page 22). Users were asked the following questions:

- What is Unix being used for in your organization?
- What additional support software would you like to see for your Unix system?
- What is needed to make Unix more usable for your entire organization?

Comparisons were made between system support software available for mature mainframe operating systems and the needs of Unix system users. An analysis of the IBM mainframe market indicated that there are products being offered by third-party software vendors that do not exist in the Unix marketplace. These products, while supporting an operating system environment, are not part of mainframe operating systems but are augmentations and additional services. Just as these services are not found in mainframe operating systems, they are also absent in Unix.

The results of the survey indicated the majority of Unix user needs were in the area of system planning and performance. Users are primarily concerned about system measurement (benchmarks, analyzers and monitors), system management (resource management; job accounting; backup, archive and restore; and tape management) and system improvement (disk tuners, job schedulers and work load balancers). They want tools to monitor and analyze how well their system is accomplishing its tasks. They are also looking for efficient procedures for managing the resources that are available to their users and for improving their system capabilities.

Once a computer system is acquired and operational, management focuses on performance measurement and analysis (Is my system doing what I expected it to do? Is it performing tasks in the most efficient manner?). In smaller systems such as PCs and single-user workstations, the process of measurement and analysis is simplified. In multiuser systems such as those supporting Unix, the problem is complex. With a large number of users performing diverse types of tasks, it is difficult to quantify how much of the resources are being used and how to plan for future expansion. While one user may be experiencing satisfactory performance, others on the system may not. Typically, systems tend to prove Parkinson's Law: Work expands to utilize all of the available resources.

Monitors collect data on system usage during normal operations for after-the-fact analysis. The goal of an organization using computers is to ensure that sufficient data processing resources exist.

Where sufficient resources do not exist, the organization must make the proper investment decisions to provide the necessary resources. Performance monitoring facilitates making better decisions quickly and systematically. It also provides management with a secure feeling that sufficient capacity will be available to satisfy the commitments it has made.

Analyzers provide management with a series of reports, statistics and graphs that detail the use and performance of data. Information obtained can be used for trend analysis, tuning and diagnosing the causes of degraded response time.

Analyzers can help determine whether additional disk controllers, disks, CPU or memory will improve system performance.

Performance monitoring and analyzing are functions that should be considered essential for any multiuser system. When implemented properly, their effects will be minimal and benefits positive.

One area of system measurement that is unique to Unix is system benchmarking. Benchmarking is used to examine the internal structure of a Unix system for maximum performance within a defined environment. Benchmarking is also used to compare the performance of multiple Unix systems and generate results on which to base informed purchase decisions that match system capabilities with user needs.

System management is critical from the first day a computer system becomes operational. Proper tools enable managers to answer questions such as, Who is using my system? What resources are they using? Where can I put all that excess data? Where did I put all that excess data?

Most third-generation operating systems provide basic data on system use by job and/or users. Unix collects data when each user logs onto the system; for each program run, it saves name, user identification, CPU used, when it ran, how long it took to run and other information about the program. While comprehensive, there is no capability to save data on what happened during a specific time of day or specific day of the week. There is no Unix utility to tally disk use on a per-user basis and save the information so that it can be recovered.

What is needed is a job accounting and chargeback system that not only allows the user to charge back the work run on the system but also to extract performance data. Job accounting needs to track system usage; allocate system resource charges to users, users groups and projects; and generate charge statements. The system should use the information about login time and CPU use and gather additional information on disk use.

Job accounting should provide managers with the information necessary to supervise the day-to-day operation of a computer system, to charge usage of the system to various users on an equitable basis and to plan for new systems and new applications.

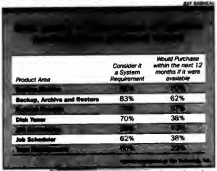
Unix utilities

Unix provides several utilities that are used for backing up, archiving and restoring files on disk.

A partial list includes FF, Volcopy, Finc, Frec, Dump, Tar, CPIO and Restore. However, these utilities do not provide for the full capabilities needed by most multiuser Unix systems. There are generally two types of backups — full and incremental. On active systems, incremental backups are done daily and full backups are done weekly. On most Unix systems, archiving is done reluctantly, if at all. There is no facility for keeping track of what files have been archived and on what tape they are stored.

A primary need in Unix is the capability to generate and maintain a data catalog of backup and archive information and the ability to accomplish incremental backups and restores automatically.

Unix is a democratic operating system. Its basic message is: Use whatever resources you want, clean up after yourself, and don't interfere with anybody else. It is a good concept for smaller systems but requires a tremendous amount of restrain by users of larger systems. What is needed is a scheduling scheme to ensure that non-time-dependent processes do not use up so much of the available resources that the interactive processes suffer.



Product Area	Consider it a System Requirement	Would Purchase within the next 12 months if it were available
[illegible]	[illegible]	[illegible]
Backup, Archive and Restore	83%	62%
[illegible]	[illegible]	[illegible]
Disk Tuner	70%	38%
[illegible]	[illegible]	[illegible]
Job Scheduler	62%	38%
[illegible]	[illegible]	[illegible]

More than 300 Unix users interviewed by Aim Technology, Inc. voiced their opinion on those system software capabilites that Unix still needs.

Job scheduling provides for system improvement by scheduling and monitoring job resource requirements.

The major purpose of job scheduling is to aid in planning and improving the overall performance of the system environment. It controls and adjusts the work load during execution, tracks jobs in response to inquiries and analyzes problems. Job scheduling provides for setting threshold limits for all commands within the system environment, measuring the effects of those limits and dynamically changing them if necessary.

By using a job scheduling system to control and manage a Unix system, a manager can increase productivity, reduce operation costs and realize the full potential of the existing resources.

Performance in a Unix system is heavily dependent on the efficiency of its direct access storage devices. Most people have heard Unix described as heavily dependent on disk I/O. This notion is true; however, this dependency is not unique to Unix. Ever since data has been stored on a disk, the problems involved in efficiently storing and retrieving data on a disk have been studied and modified. The University of California at Berkeley's Unix Version 4.2 attempted to solve the problem by restructuring the way data was stored within a file system, but the problem still remains.

Dynamic solution

The storage and retrieval problem is a dynamic one and requires a dynamic solution. As data on a disk is continually modified, the physical layout of the file system deteriorates. Files become fragmented and dispersed over the physical disk. Additional time is required for physical positioning (seek time) and rotational latency (interleave) to read a requested file. The random ordering of the file system becomes even more acute when files are used frequently or when files change size often.

Even program files that never change in size can become permanently scattered over the disk in a random pattern due to the physical placement of the free space available when the file was created.

Disk tuning is a solution to the file placement problem. The purpose of disk tuning is to consolidate the physical layout of the data in the file system to correspond to the logical usage of the disk.

Disk tuning consolidates and organizes files into a contiguous area based on frequency of access, thus ensuring that the optimal performance of the file system can be attained in a multiuser environment. It ensures that the most active files can be accessed in the least amount of time.

With disk tuning, the monitoring function operates on a periodic basis to record file system I/O activity. It records data on the files most frequently accessed. The analysis function identifies the files that are most active, ranks them in order of activity and provides statistical information. The reorganization function provides for the actual placement of data within the file system for optimal access.

Although we have defined a common set of needs existing in the Unix community today, solutions to these problems are presented with many challenges. Among these challenges is that Unix is used for a wide range of applications including document preparation, software development, office automation, business applications and factory automation in addition to the traditional uses in engineering, education and research and development.

Further, there is a wider range of hardware used to implement Unix systems than for any other operating system. The architectural diversity of disk drives and controllers in CPUs from micros to supercomputers, front-end processors, multiple processors and networked processors offers a greater challenge than traditional software support products have ever before had to address.

More style than substance

Also, the Unix operating system actually consists of a family of related versions including AT&T System III, AT&T System V, AT&T Version 7, University of California at Berkeley Unix Version 4.1, Berkeley 4.2 and other proprietary versions offered by hardware vendors. Though these differences exist, in reality it is more in style than in substance. Therefore, it is necessary to know in which manner each differs.

Even more subtle than the various versions of Unix are the differences introduced by human nature. The same version implemented on different hardware will contain minor differences. These "minor" differences show up when software development is 90% done and requires the other 10% to be complete. These differences must be addressed by both manufacturers and software developers. ■

McKee is vice-president of business development for Palo Alto, Calif.-based Aim Technology, Inc., a supplier of Unix system software. McKee specializes in software development and marketing.

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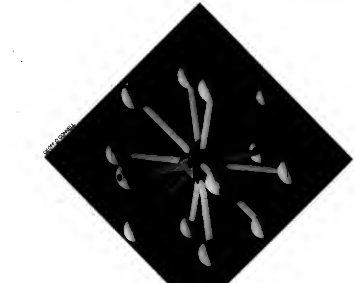

GEOFF O CONNELL

A Single Network Solution

·BY·JUDI·UTTAL·

Different operating systems work best for specific computing needs, whether those needs relate to the individual user or to a group of users. However, connecting these seemingly disparate systems can solve many problems.

The selection of a computer and operating system is often driven by the reputation of the system manufacturer, the availability of appropriate application software and the overall system cost. However, a criterion often not considered is the functional characteristics of the computing problem.

Computing problems can be divided into two categories — personal and organizational. Personal problems relate to the individual; application software designed for personal problems includes word processing and spreadsheets. Organizational problems relate to a group; application software designed for organizations includes data bases, accounting packages, inventory control systems and scheduling programs.

These two types of applications differ in their computing requirements.

Personal applications are more suited for personal computers where the target operating system is usually Microsoft Corp. MS-DOS; organizational applications are more suited for multiuser systems where the target operating system is either a proprietary operating system or Unix. The table on page 25 outlines the task differences within these two categories.

Intel Corp. offers an example of the differences between personal and organizational tasks. Within the same physical area of the firm there are two separate marketing departments. One product marketing group, the OEM Microcomputer Operation (OMO), is responsible for managing the Intel Multibus board products. The second product marketing group, the Integrated Systems Operation (ISO), is responsible for managing the Multibus systems products. The responsibilities of both groups range from forecasting, pricing, writing fact sheets and developing presentations. Both groups are made up of six product managers.

Both OMO and ISO decided to automate their product marketing departments around the same time. ISO wanted to use a Multibus-based system and selected the multiuser Microsoft Xenix operating system. The choice of a multiuser system made sense because the group's products were strongly interrelated. The forecast for the number of Multibus systems served as input for the forecast for the two types of operating system packages. The forecast for the operating systems affected the forecast for application packages. This inherent interrelationship suggests that the application was primarily organizational in nature and that a multiuser system was appropriate.

OMO, on the other hand, decided to standardize on the IBM Personal Computer running MS-DOS. IBM PCs were preferred because of the application software available. The choice of a single-user system made sense for OMO because unlike ISO, OMO's products were not closely interrelated. The forecasts for the individual pieces of the board product

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line — disk controllers, serial I/O boards and CPU boards — were fairly independent. Hence, the application was primarily personal in nature, and a single-user system was the appropriate choice.

Classifying work groups as being either personal or organizational in nature simplifies the selection of a computer system. With time, however, this simplification may lead to problems. At first glance, an application may appear to be either personal or organizational; in reality, most applications are made up of an assortment of personal and organizational tasks. As a company increases the demand on its computing facilities, these limitations become increasingly obvious.

Take, for example, the product marketing groups forecasting away on their new computers. With time the product managers get more and more dependent on their systems. The ISO product marketing engineers use the multiuser system more and more and discover that the computer is overloaded. They cannot get their forecasts out on time because it takes 10 minutes to update a spreadsheet. New PC programs suited to their needs proliferate, but they are forced to use awkward Unix commands like VI, which employs the visual text editor.

The product managers using the multiuser system look enviously at the PC users because they have complete control over their systems and have new tools available all the time because they are using MS-DOS.

At the same time the OMO product marketing engineers also increase their PC use. However, cost-cutting measures have limited the number of peripherals they can purchase, so they share a printer, setting aside one system for this task. These engineers stand in line to use the printer and talk about how much they would like a mail system.

As they start working on the annual plan, they work closer together, and all board forecasts must be assembled into one spreadsheet. They begin to look enviously at the multiuser system users who have an interrelated spreadsheet that rolls together all their numbers.

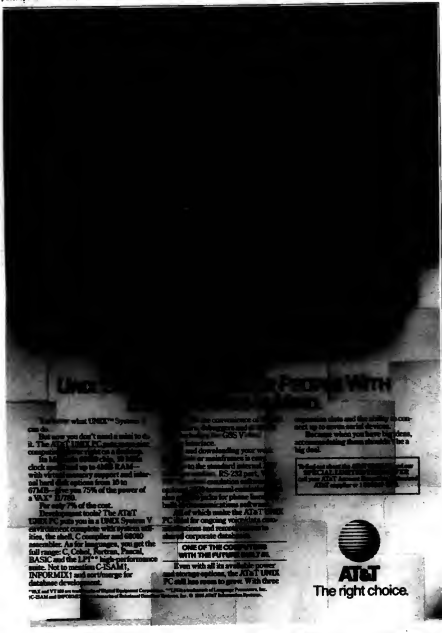
With time, each group realizes that its tasks are both personal and organizational. Each wants the independence, guaranteed performance and abundant software the PC provides, but it also wants to share printers, send mail and create interrelated applications.

> ”
>
> *Users want the freedom, guaranteed performance and abundant software the PC provides, but they also want to share printers, send mail and create interrelated applications.*

Two operating systems

The solution to this problem can be a two operating system environment — where the personal tasks are executed on the PC and the organizational tasks are executed on a multiuser system. The fundamental considerations in designing a two operating system solution are the following:

- Both operating systems must share the same file system. The multiuser system should act as the centralization point and provide discretionary file security, password protection and backup capabilities.
- The solution must not affect the operating system interface, so that all applications run in the dual operating system environment.
- Resources such as printers must be centralized to allow access by all members of the work group.
- Performance of both operating systems must be comparable to either operating system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running independently.

The dual operating system environment described above should be a networking product designed so personal tasks can be executed by the MS-DOS operating system and organizational tasks can be supported by the Unix operating system.

When this is the case, the Unix system becomes the centralized point of a PC-based work group. MS-DOS users may store files and MS-DOS applications on a Unix host and access them just as if they were on a local fixed disk. Both MS-DOS and Unix applications can access the same files. Because the operating system interface is not disturbed, MS-DOS programs such as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar can access Unix files.

> ”
>
> *When MS-DOS users utilize the Unix systems as a file server, security is preserved through the Unix protected file system.*

To obtain access to the Unix host would require providing a login and password. When MS-DOS users utilize the Unix systems as a file server, security is preserved through the Unix protected file system. The system administrator performs regular backup via the Unix backup facility.

For ease of use, it is important that PC users and applications can transparently spool print requests to an attached Unix printer without user intervention. A user running Microsoft's Multiplan, for example, should be able to initiate a print request from the application and have it immediately spooled to the Unix system printer.

In addition, users should not notice any performance differences when accessing a file on the Unix disk rather than on a local disk. Performance continuity can be achieved with a networking product running over Ethernet. Access over RS-232 through a modem gives users remote access to the Unix file system.

The availability of Digital Equipment Corp. VT100 terminal emulation is an important feature to this configuration because it will allow the PC to double as a Unix terminal. In this way, both MS-DOS and Unix applications can run concurrently.

The use of this type of networking product is illustrated in a department similar to that of our product marketing groups. Each product manager is supplied with a PC and a Unix system

JEFF BABINEAU

Personal vs. organizational applications: Differences in tasks

Personal Applications

Users' primary tasks are not computing. They are likely to be occasional users who are unwilling to invest in learning a new package. Computers are ancillary tools

■

Tasks are highly interactive

■

Data bases are small and require access by a limited number of users.

■

Total storage requirements are fairly small

■

Low volume printing, either draft or letter quality

■

There is little or no need for users to access corporate resources or business unit computer systems.

■

Data or network security is not a great concern.

Organizational Applications

Applications are transaction processing or oriented toward a common data base

■

Applications are inherently batch or CPU intensive

■

Data bases are large and require access by a large number of users.

■

Total storage requirements are large.

■

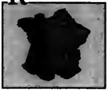
Expensive or unusual peripherals are required.

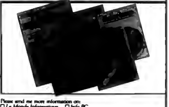
■

Access to remote resources, such as a corporate mainframe or a public value-added network, is desired.

■

Security and integrity of a central data base are critical.





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account. All data and MS-DOS applications are stored on the Unix system. As the group's needs become increasingly organizational in nature, the system configuration can adapt.

Each group has both individual and shared spreadsheets. When the computing requirement is personal, the user maintains autonomy; however, as the environment changes, the computing resources adapt to allow the computing resources to be interrelated.

Any MS-DOS spreadsheet program is used. The data resides in a group account, and all updates to the forecasts are run on the product manager's PC so that when he is modifying and updating a spreadsheet, no incremental load is placed on the multiuser system.

When the spreadsheet is ready to be printed, the user issues the proper print command and the print request is immediately spooled to the Unix printer.

Backups are coordinated by a single system administrator. If one product manager accidentally deletes a data file, the system administrator can recover that file.

Thus far it has been shown that if you oversimplify within a computing facility, users become dissatisfied because of limited functionality or performance. Therefore, the computing facility should be set up to allow for both personal and organizational tasks.

A flight reservation system

For example, consider a flight reservation system. Entering and modifying the data is highly interactive; however, sorting and reporting the data is CPU intensive and can be done as a batch job. Data entry is a personal task, while sorting and reporting is organizational. The next level of computing environment optimization is to support distributed processing providing for applications that optimize CPU power by executing personal portions of programs on the PC and organizational portions on the multiuser system.

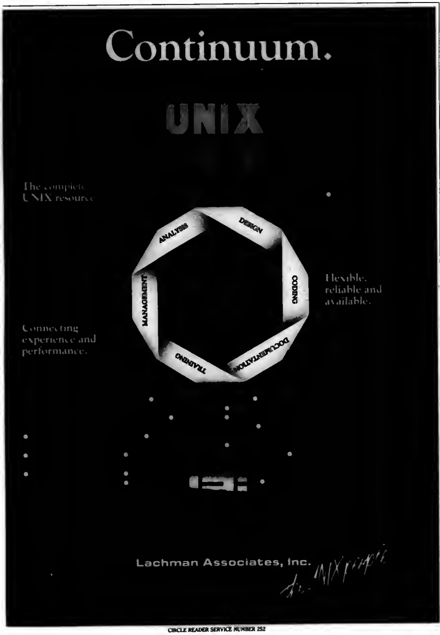
This functionality is necessary and can be made available through distributed processing commands. Programmers can design applications so the personal portion is running on the PC and a Unix process can be invoked directly from MS-DOS when an organizational task is required. Through the use of distributed processing commands, system managers can get the most power out of their computing resources.

> ”
>
> *A dual operating system should be designed so personal tasks can be executed by MS-DOS and group tasks can be supported by Unix.*

To optimize computing facilities, a system manager must fully understand the nature of their uses and applications. Is the use primarily personal or organizational? How will the requirements vary as users mature?

The facilities should be designed to be flexible so that they may easily adapt. The first step is a network allowing the PC to be used for personal tasks and the Unix system to be used as a backbone for organizational tasks. In time, applications can be designed to maximize their use of the computing facilities through distributed processing. The best distributed processing systems must be both organizational/multiuser and personal/single user in nature to best meet the needs of users. ◼

Uttal is marketing director for Santa Monica, Calif.-based Locus Computing Corp., a firm specializing in software development. She has spent the last three years in marketing and new product planning in the Unix system marketplace.



CIRCLE READER SERVICE NUMBER 252

TECHNOLOGY TRENDS

Unix Joins The Party

With closer links being established between Unix and MS-DOS, the user indifference that has plagued Unix may just be changing for the better.

• BY • STAN • KOLODZIEJ •

After several years of relative obscurity, Unix burst onto the scene under AT&T only to wander, like a modern Moses, in a wilderness of customer indifference. With closer links being established between Unix and machines based on Microsoft Corp. MS-DOS, however, customers are beginning to listen.

A previous lack of network links between Unix systems haunted Unix vendors when the computer market stalled a few years ago. Before that, Unix vendors could see little reason to pressure their value-added resellers (VAR) and systems integrators to include networking in their Unix offerings.

Systems integrators and VARs concentrated on supplying users with customized software, feeling little customer pressure for connection to other Unix or non-Unix systems.

With a booming computer market, this strategy worked well. When the market stalled, however, Unix vendors found that customers were changing their purchasing strategies, and a big part of these strategies centered on networking and multisystem links. Isolated systems quickly became suspect. The new corporate emphasis on purchasing and systems control put MIS more in the driver's seat, and MIS executives are just now beginning to see that networking disparate systems can be a way of gaining control over departmental systems and reducing operating costs. Tying Unix machines to IBM systems has become a big asset in selling MIS on Unix.

The push by vendors to link Unix with IBM systems is not only centered on high-end IBM hardware. Unix vendors see a market developing for linking applications between Unix-based systems and the tens of thousands of IBM Personal Computers and compatibles running MS-DOS in offices across the U.S. Though this market is not new (MS-DOS/Unix software links such as PC-Interface from Locus Computing Corp., Santa Monica, Calif., and Tango from Computerized Office Services, Inc. (COSI), Ann Arbor, Mich., have been available for years), it is definitely on the upswing.

The reasons for joining the MS-DOS and Unix worlds vary, depending on whom you ask.

According to Collier Buffington, president of Vianetix, Inc., the Boulder, Colo., maker of Vianet, a networking product bridging MS-DOS and Unix, the company's decision to enter the market had nothing to do with user pressure.

RICH TENNANT

"We saw the benefits of providing users with Unix and MS-DOS strengths," Buffington said. "The fact that Unix offers hardware independence and the similarities we saw in DOS and Unix made our decision easier."

Judy Uttal, marketing director at Locus, said her company based part of its decision to enter the field a few years ago on conclusions reached by a Unix research company.

"Unix will continue to be used driving work group systems in dedicated applications environments," she said. "Some of this process, however, will now be spread out over Unix PCs and MS-DOS machines. That's a natural extension."

Jocelyn Young, analyst at Future Computing, Inc. of Richardson, Texas, is more blunt. "Unix users have been starved for software applications and are crying out. They see what's available in the MS-DOS market, and they want part of it."

The evolution of linking MS-DOS and Unix applications has gone through three stages, according to Young. The first had Unix systems vendors taking such popular MS-DOS programs as Multiplan from Microsoft Corp. and converting them to run on their machine hardware, a process that Young termed time-consuming and costly and that received little support from microcomputer software vendors.

"The software vendors said, 'Fine, convert the program to Unix, but you port it and you support it,' " Young explained. "They had little interest in putting their money up to see their programs running in what was a small Unix market."

In the second stage, Unix systems vendors such as Altos Computer Systems, Inc. and Fortune Systems Corp. began providing add-in boards that would allow IBM Personal Computers and compatibles to act as Unix workstations. The conversion process, however, was often slow, usually providing only ASCII-level conversion.

> *'Software vendors said, "Fine, convert the program to Unix, but you port it and you support it." '*
>
> **— Jocelyn Young**
> **Future Computing, Inc.**

The third stage involves third-party software vendors. "Today, the Unix/MS-DOS market is composed mostly of third-party vendors providing software resident in both Unix and MS-DOS systems allowing data transfer and conversion between both systems," Young explained.

"As always, however, the push to bring Unix and MS-DOS together is from the Unix manufacturers and users, not the MS-DOS side," she said.

Not everyone would agree with that assessment. Bernie Hill, vice-president of marketing at Interactive Systems Corp., Santa Monica, Calif., said many large organizations are now interested in using Unix systems as file and printer servers for MS-DOS-based micros to make up for the lack of power in most micro local-area networks (LAN).

"MS-DOS units can be connected as intelligent Unix workstations," Hill said. "Many corporations want the power of Unix machines to produce larger systems."

When asked about traditional MIS apathy toward Unix, Hill quoted a recent report from Forrester Research, Inc. of Cambridge, Mass., which stated that 21% of MIS managers surveyed in Fortune 1000 companies said they would be using Unix systems in the near future.

"That's a heck of a lot of Fortune 1000 customers that are interested in Unix. On top of that, add the government business, add General Motors Corp. and add all the scientific and engineering firms that have data processing departments and people who are familiar with Unix. MIS is not going to be able to handle all applications with IBM systems."

John Doherty, president of Rabbit Software, Malvern, Pa., agreed.

"The market seems to be evolving toward people who have thousands of PCs and who want to get at data bases," Doherty said. "There are two ways of doing it: One is a connection from LANs to file servers; the other is providing a gateway from a LAN to the mainframe. Many Unix-based systems are going to be used as file servers to take advantage of their power and speed and to give PCs multitasking, something which is currently lacking in stand-alone and networked PCs."

Brian Boyle, president of Novon Research Group, San Francisco, breaks the present MS-DOS/Unix market into three categories:

- The hardware approach, which uses coprocessors like those the IBM RT Personal Computer and AT&T Unix PC employ with software extensions.
- The systems approach, which runs MS-DOS as a task under Unix or side by side using software resident on both Unix and MS-DOS machines.
- Conversion at the applications level, such as Network Innovations Corp.'s Multiplex-PC, which can permit users to analyze data on the Unix system using MS-DOS programs such as Lotus Development Corp.'s 1-2-3.

Prices vary, but such hardware and software link products generally range from a few hundred to several hundred dollars,

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depending on the options.

"We did our own internal study of users," Locus' Uttal explained, "and found that most users would not pay more than $350 for the use of another operating system [Unix]. Users are accustomed to seeing operating systems come bundled."

Jim Guyton, director of information systems at the Rand Corp., Santa Monica, Calif., has used Locus' PC-Interface to connect several Compaq Computer Corp. PCs and other compatibles with three Digital Equipment Corp. VAX computers running University of California at Berkeley Unix Version 4.2 and 4.3. The PCs are used by Rand researchers and directors to access VAX data, which is gradually being migrated from the company's IBM 3032 mainframe into the Unix departmental machines.

"We had our PCs connected to the IBM mainframe, but it was slow and unreliable," Guyton explained. "PC-Interface works as fast as having the data on a floppy disk in most cases. The data is more immediate."

Guyton said he looked at other Unix/MS-DOS software links, but one of the attributes of PC-Interface that attracted him was the remote execution facility that allows PC users to transfer data to Unix workstations.

"It gives us a little more flexibility in moving files. The only problem we've experienced with the product is incompatibility with one of the PC compatible's operating systems. In these cases, users have had to run it on [IBM] PC-DOS instead of MS-DOS."

Another more ambitious project is under way at an AT&T private branch exchange manufacturing plant in Denver.

John Bongiovanni, information center manager at the plant, has already installed 100 copies of Touchstone Software Corp.'s PC Works software in AT&T 6300 PCs as part of a 15,000-foot Ethernet network linking 400 of the micros with several Unix-based AT&T 3B2 Model 300 hosts. Bongiovanni said he has used boards from 3Com Corp. for connecting the PCs to Ethernet and PC Works as the network front end to handle data transfer and conversion between MS-DOS and Unix.

Users of PC Works at the AT&T plant include support staff and managers for various administrative and research divisions who need to tap into larger departmental data bases. Bongiovanni said that Unix file protection is accomplished by Unix commands through the PC Works software.

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> **Future Computing, Inc.**

"To a PC user, the system appears almost as a virtual hard disk," Bongiovanni said. "The thing that sold us on PC Works was its single command mode, making it easy for users. It also makes the PC, not the Unix machine, the main engine. Our group has heavy MS-DOS users, and we don't really need the power of the Unix machine to access Unix files occasionally."

COSI's Tango (also sold by VARs under the name Synchrony) works from the other end, Keith Burligh, group manager of product sales at COSI, said, "Tango puts the Unix machine in charge. We're aiming Tango at the MIS people who are concerned about maintaining data control over PCs and yet staying with departmental computing. Many PC users don't care to get involved with Unix commands or become Unix literate."

Burligh — who maintained that COSI is about to release Version 3.4 of Tango, which will provide remote file access allowing someone to go from a Unix workstation to a particular PC to access a file — contended that Tango performs several

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communications functions: terminal emulation, file transfer between Unix and PC machines and remote control from the PC processor. More link products, in fact, are offering such multiple functions.

Not all users are happy with the MS-DOS/Unix link packages that are available. The Federal Reserve Bank of Cleveland has looked at some programs and found them coming up short, especially in the area of converting files transparently at the applications level.

"There's still too much for the user to know," explained David Rich, the bank's system vice-president of communications. "Users need 99% true conversion for applications."

Walter Kozachek, editor/analyst at Datapro Research Corp., Delran, N.J., said he tested Alloy Computer Products, Inc.'s DOS plug-in board on the AT&T Unix PC and found it slow.

"You still have to go through MS-DOS and Unix, and you get screen delays," Kozachek explained. "The whole Unix/MS-DOS issue is still a technical one. The Unix operating system is still dedicated to technical users."

Though he said Datapro is just under way with research to study the MS-DOS/Unix market, Kozachek made it clear that he does not think that the market is a big one. "Unlike MS-DOS, Unix has a particular set of applications areas that don't cross MS-DOS. There are too many incompatibilities."

Jay Wettlaufer, principal at American Management Systems, Inc., a consulting firm in Arlington, Va., agreed. "Until you put some friendly front end on Unix, it won't have a chance with MS-DOS users," he explained. "The whole direction with MS-DOS is providing a great human interface product, while Unix is still only friendly with programmers.

> *'The whole direction with MS-DOS is providing a great human interface product, while Unix is still only friendly with programmers.'*
>
> **— Jay Wettlaufer**
> **American Management Systems**

"Unix needs more tightly coupled software that runs partly on Unix and partly on MS-DOS," Wettlaufer added. "The answer isn't in making your Mercedes so friendly that your grandmother can use it. The reason there isn't that much great software for Unix is that the Unix market is starving so much for software that developers reach a certain point and say [the software] is good enough."

Novon's Boyle said better MS-DOS/Unix interfaces are about to appear. "You have to remember that the three most important things to software developers are installed base, period. The base is increasing and so is the perception that Unix and MS-DOS are not competitors. There are more Unix users out there than is often reported. MS-DOS is stand-alone; Unix is multiuser. Many surveys just count systems, but there are an average of more than four users per Unix system, and Unix users are at their stations a lot more than PC users. DOS users only use their machines about three hours a week."

Help might be on the way. Locus has introduced Multisystem Merge (sold by AT&T as OS Merge), a software package that the company said allows simultaneous transparent execution of both Unix and MS-DOS operating systems in the same computer (Intel Corp. 80286-based PCs). Ray Norberty, director of sales for Touchstone Software, said the company is upgrading PC Works this summer to make it even easier for MS-DOS users and added that it will soon be coming out with a product that will incorporate into Unix an interface similar to Microsoft Corp. Windows. And Wettlaufer said American Management Systems has a front-end MS-DOS shell to Unix that will advance the user interface.

Others such as Interactive Systems and Phoenix Software Associates Ltd. of Norwood, Mass., are looking forward to the new Intel 80386-based micros, which are expected to start appearing in early 1987. Interactive's Hill said his company and Phoenix have entered a joint development and marketing agreement to market a product that would allow MS-DOS to run as a task under AT&T's Unix System V.3 on the Intel 386 processor. Intel has made sure Unix will be supported on the 386, leaving open the tight coupling of Unix and MS-DOS on the same machine.

Microsoft's slated MS-DOS 5.0 is expected to take advantage of the 386 processor's power and multiuser functions and will include networking features that will place it more into the realm of Unix, but many are skeptical that Microsoft will go far enough in this direction.

How big is the MS-DOS/Unix market? Research statistics will probably be in at the end of 1986. Right now it's an unknown part of a 1985 total Unix worldwide market of $3.6 billion as calculated by Don Bellamy, associate editor of Corporate Planning Services at International Data Corp., Framingham, Mass. "It won't be a spectacular market," Boyle said, "but it will grow steadily, like Unix in general." F

Kolodziej is a senior writer at Computerworld Focus.

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SPECIAL SECTION: APPLICATIONS OUTLOOK

Making Inroads In The Office

DAVE RIDLEY

·BY·STAN·KOLODZIEJ·

What's wrong with Unix? Nothing that a little more market share couldn't cure.

Actually, the patient isn't doing that badly. Unix is gradually shedding its image of multiple personalities, gaining more vendor support and holding its own in the midsize systems range.

AT&T, Unix's patron, has been chastened and is keeping a lower profile, letting OEMs and software vendors ease Unix into vertical markets instead of trying to take the entire office by storm. More importantly, the force surrounding AT&T's Unix System V is finally strong enough to attract a growing roster of product support. System V is close to its claims of being the de facto Unix standard in the office, while University of California at Berkeley Unix Version 4.2 is gaining ground as the front-running operating system for engineering workstations.

There is finally a movement regarding Unix in the office. Unix vendors are making headway by either bypassing MIS or relating to MIS on its own terms, namely, IBM. Unix vendors still face the kind of Big Blue wall put up by MIS people. Consider the following comments:

"We have no need for [Unix]," said Richard Monnot, director of computer operations at Consolidated Natural Gas, Pittsburgh. "There's nothing it can do that IBM can't."

"I'm not sure what our departments are doing," said Bruce Burrows, manager of information systems at the U.S. Department of Justice, Washington, D.C., "but I know we're [MIS] happy recommending departmental computing through [IBM's] VM/CMS. Unix hasn't come into the picture."

Unix system vendors have gotten smart on the rebound, however. Instead of coming back directly at MIS, Unix vendors have been circumventing centralized control, dealing with companies on a departmental level, clustering 16- and 32-bit Unix supermicros running specialized, vertical applications. To penetrate further and gain MIS support, more Unix vendors have been courting MIS with links to large IBM Systems Network Architecture (SNA) installations.

The Unix vendors' success hasn't gone unnoticed. Until last year, the midsize, departmental market was a vacuum in IBM's strategy, with most of the large-vendor slack taken up by minicomputer maker Digital Equipment Corp., which offers Ultrix (its Unix version) along with its mainstay VMS operating system. (DEC's base of Unix users is not overwhelming but substantial. Of 8,000 DEC VAX user sites surveyed in 1985 by Computer Intelligence, a San Diego-based research firm, almost 10% were using Unix as the primary VAX operating system.)

IBM, however, is taking action in the departmental market, shoring up its System/36 and 38 product lines and taking aim at DEC and scores of Unix-based departmental vendors. The result is a scramble by Unix system vendors to expand their value-added offerings by providing more links to IBM's SNA, VM, CICS and other high-end operating environments.

Companies like Relational Database Systems, Inc. of Palo Alto, Calif., for example, have been merging Unix and IBM's SQL relational data base language for years. Such interfaces to IBM systems are expected to blossom in the Unix market to ride IBM's coattails as it attempts to add the mid-range market to its dominance in the mainframe and microcomputer arenas.

"It's a good idea. Unix vendors are going to see more middle ground lost to IBM," explained Larry Timmins, analyst with the Gartner Group, Inc. in Stamford, Conn. "As IBM plugs its mid-range systems into its mainframe base with LU 6.2 and other links. Unix vendors are going to come up more frequently against corporate MIS [departments] that are not going to take kindly to the idea of replacing MVS and CICS with Unix. Unix will only be considered as something in relation to IBM, [scrutinized for] how it

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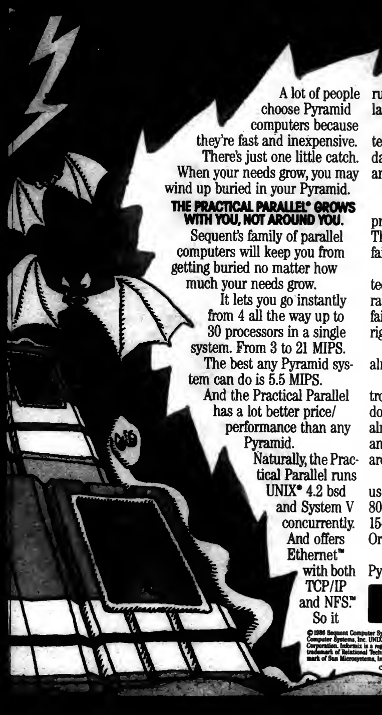

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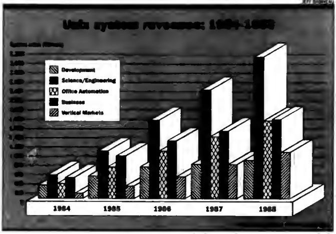
SPECIAL SECTION: APPLICATIONS OUTLOOK

will work with SNA, with LU 6.2, with DB2 and so on. Unix will be successful only as a node in an IBM environment."

Timmins added that a huge potential for Unix in the office lies in providing SQL on Unix machines. "Our research shows that up to 40% of new programs written in 1990 will be SQL based. SQL on Unix machines will help get them into corporations, at least in the short term."

The mainframe arena has always been a closed book for Unix — and may always be. Unix was developed originally for minicomputers, and those few companies trying to sneak Unix into the mainframe field have been burned. For example, Computer Intelligence recently released a survey of 11,000 IBM mainframe sites and found two installations using Unix as their primary operating system. Not exactly a massive assault.

In the low-end office market, Unix vendors again came up against an IBM wall and have changed strategy. Unix vendors are now trying to use Microsoft Corp. MS-DOS/Unix interfaces as a driving wedge into the stand-alone office microcomputer market. Unix is getting some help here. The multiuser, communications strengths of Unix are being noticed in light of the market slowdown and general user disappointment with available micro local-area networks (LAN) and micro-to-mainframe links. Another plus for Unix has been IBM's half-hearted attempt to expand the capabilities of its Token-Ring Network. Also helping Unix is the fact that multiuser Unix systems are providing better price/performance ratios than most micro LANs and standalone systems.



One way to get more MS-DOS users over to Unix is by discounting some of the traditional negatives attributed to Unix. One bugaboo has been the lack of application software. Over the past two years, however, that gap has been filled. "AT&T's manual of [Unix] programs is an inch thick," said David Fiedler, president of Infopro Systems, Inc. "The number of good Unix programs by third-party vendors has exploded into the thousands."

Another problem has been understandable confusion over Unix versions. About two years ago there were more than 30 versions of Unix in different markets, each version usually tied to the hardware of a specific machine. Though most Unix versions could exchange data with each other and could be ported fairly easily from machine to machine, many were proprietary enough to warrant extra programming to enable the systems to work together more effectively. Many such Unix work-alikes have faded away, while only a limited number of Unix systems (for example, Venturcom, Inc.'s Venix and Whitesmiths, Ltd.'s Idris) have been licensed with AT&T or even come closer in line with AT&T's System V specs.

Such holdouts, however, are not really geared toward the general office application market. Brian Boyle, president of the Novon Research Group, San Francisco, said that these smaller Unix versions make up only about 2% of the total Unix market, filling specific market niches, especially with applications requiring fault-tolerant, real-time processing, where Unix has proven weakest.

There is no doubt AT&T's System V is finally gaining momentum and more support. AT&T has recently helped its cause by coming out with System V.3, which added a long-awaited file transfer capability across multivendor networks as well as a file locking facility. Some analysts are saying V.3 will provide more punch for Unix in commercial applications. Others say it is a major link in making System V the de facto Unix standard in the office.

Users do seem to be taking notice. Out of the past confusion with Unix operating systems and vendors, the direction of Unix seems to be much clearer.

"For expansion and price/performance, Unix is better now," explained Bob Bologna, director of systems and programming in the reservations department at Sheraton Corp., Braintree, Mass. "We looked at Unix a few years ago and were not impressed. What we see now are vendors falling in line with System V and a lot more help coming from AT&T in the way of tools to optimize the Unix environment. We've also seen the level of Unix expertise out there change dramatically for the better."

Unix and its C programming language are certainly in the running in the scientific/engineering workstation market. In fact, it's basically the only game in town now, replacing Fortran and the brief but fading star of Pascal as the workstation operating system of choice. According to one research group, there are currently about 80 vendors offering Unix on their workstations, and that number is expected to grow as more vendors target the hot workstation market.

Sun Microsystems, Inc. of Mountain View, Calif., has been in the forefront in making Berkeley Unix 4.2 probably the most supported operating system at the middle and low-end workstation markets.

Sun has helped change the workstation market dramatically in the past two years. The company first put great pressure on mainstay workstation vendors such as Apollo Computer, Inc. and Computervision Corp. by introducing powerful, low-cost 32-bit workstations running Unix. Both Apollo and DEC were forced to introduce lower priced Unix workstations earlier this year in response to Sun's foray into the MIS market with a line of Unix-based workstations starting at under $8,000. Even IBM, whicb introduced a new line of workstations using reduced instruction set computer (RISC) architecture, offers a variant of Unix called AIX (from Interactive Systems, Inc.) that consists of enhancements to Unix System V.1, including features from System V.2 and Berkeley 4.2.

Apollo and IBM have raised the workstation ante a bit by introducing IBM PC AT-compatible coprocessor boards to plug their workstations into the MS-DOS applications world. Sun has answered with its own PC AT coprocessor board but raised the stakes by including a package allowing IBM PCs and compatibles to communicate over Sun's Network File System (NFS), a set of protocols giving the ability to communicate over a multivendor workstation networks.

Just as Ethernet baseband cable and the Transmission Control Protocol/Internet Protocol from the Defense Advanced Research Projects Agency have become de facto networking standards in the Unix workstation community, Sun's NFS and the recently introduced Remote File System (RFS) from AT&T are in the lead as the primary network file transfer systems for Unix machines.

"We're supporting AT&T's RFS but not NFS," explained Mark Hatch, group manager for networking and operating systems at Apollo, Chelmsford, Mass. "We still think a big drawback with NFS is its lack of concurrency control, which AT&T has addressed [through file locking]. There is a two-year probation period for new products, and Sun might get some initial support for NFS, but the stature and support from AT&T for its RFS will win out. NFS is temporary."

Although Sun has attained surprising support for NFS from Unix hardware vendors (such as as Sequent Computer Systems, Inc., Gould, Inc. and Pyramid Technology Corp.), software communications vendors as well as third-party vendors supporting DEC VAX systems, Hatch said it would take patronage from the likes of DEC or IBM to give NFS staying power.

Regardless of the ultimate primacy of NFS or RFS, there are signs that the Unix marketplace is finally coalescing around proposed de facto and official standards. "I think the Unix industry has learned its lesson about muddying the market with too many versions of the same thing," said Carl Machover, president of Machover Associates Corp., White Plains, N.Y.

One area where Unix promises to make some inroads is on manufacturing shop floors, where Ethernet baseband cable is being used for harsh environment LANs. (General Motors Corp.'s steamrolling networking facility, the Manufacturing Automation Protocol, specifically ties Ethernet into its architecture.)

Unix has been given a big lift in the manufacturing arena from Electronic Data Systems Corp. (EDS), the GM subsidiary responsible for the long-range revamping of GM's computer systems. EDS has officially stated to computer vendors that if they want part of the huge automobile manufacturer's future computer business, they will need to supply Unix with their products.

Vendors are putting Unix manufacturing systems in place, gearing up for what is becoming a hot market. A good example is Logisticon's Unix-based Dispatcher manufacturing and shop floor control system that runs on Hewlett-Packard Co.'s new RISC minicomputer systems. Dispatcher contains modules taking users through shop floor control to purchasing and cost accounting, all running on HP-UX, HP's version of AT&T's System V. DEC, Honeywell, Inc. and others are also expanding their Unix manufacturing systems offerings either in-house or through third parties.

"Unix will always do well in the manufacturing and research fields," according to Novon's Boyle, "because of its steady hiring of those people who have come out of the academic environment with a love for Unix. As manufacturing MIS comes in closer contact with these [Unix] people, they will give Unix more clout."

Boyle's faith in the rise of Unix rests in the scientific/engineering market where Novon predicts that revenue from shipments of Unix-based systems will jump from a 1985 figure of 1.1 billion to 3.2 billion in 1988 (see chart this page). Novon is not as optimistic about Unix making headway in the office, however. The company is expecting Unix business systems revenue to climb only to 1.7 billioo in 1988 from 1 billion in 1985.

"One of the biggest obstacles to Unix in the office might be in overcoming a huge misconception," Infopro's Fiedler said. "People still place Unix in the domain of long-haired academics and programmers. The fact that it's no longer difficult for the end user is beside the point. Old perceptions die hard."

Seems so. A recent user survey conducted by a research firm for Honeywell posted a curious conclusion. "It is striking to note," the study said, "the total lack of interest on the respondents' part to Unix. Our perspective is that they are uninterested in and perhaps oblivious to base-level technologies, concentrating instead on the application-level functionality that will be delivered."

Unix for the office is obviously still a tough sell. ◼

Kolodziej is a senior writer at Computerworld Focus.

SPECIAL SECTION: APPLICATIONS OUTLOOK

Finding Answers Through Unix

DAVE RIDLEY

·BY·REBECCA·HURST·

Looking for corporate Unix users is like looking for oases in the Sahara desert. They are hard to find, but they are teeming with life.

In the vast, IBM-dominated territory of large corporate users, only about 1% of MIS department computer systems run the Unix operating system, according to the Gartner Group, Inc., a Connecticut-based computer consulting firm. Unix evokes little more than apathy in most MIS departments, but within a small group of offices with Unix-based systems, most users praise the operating system and the applications that run on it.

In part, the apathy of MIS directors can be attributed to the fact that, until the early 1980s, MIS directors were primarily responsible for a company's mainframe system, explains Lawrence Timmins, a Gartner Group analyst. The extent of MIS' influence on departmental minis and supermicrocomputers, he says, was limited to its agreement not to resist a group's purchase request for such systems. Consequently, MIS directors have had little contact or use for the minis and supermicros on which the Unix system chiefly runs.

The MIS directors of IBM shops interviewed by *Computerworld Focus* uniformly maintain that no applications are driving them in the direction of Unix. "We're more application driven than technology driven," explains Timothy Hensley, director of business systems for Clorox Corp. in Oakland, Calif. "If an application required us to use Unix, then we would consider it. Nothing is forcing us in this direction, though."

Company departments are still primarily responsible for choosing computer systems that meet their local needs. For example, Honeywell, Inc.'s Avionics division, based in Clearwater, Fla., installed an Interleaf, Inc. text publishing system a year ago. "In our company, when a user wants to get a computer, he contacts the business computer group. The group asks what kind of computer he wants, what operating system and what the computer will be used for," says Donald LaLuzerne, systems analyst at Honeywell Avionics.

And even though General Motors Corp., Troy, Mich., adopted Unix as the standard for computers for its manufacturing facilities, the decision was not initiated at the MIS level. The adoption was a two-year process, according to John Williams, chairman of GM's Unix System Implementation Task Force, who describes the Unix choice as a bottom-up decision that made it through the system. "The original decision came from the engineering levels from engineers like myself," he explains. "It took us a while to get the standard through the levels of management."

Another factor contributing to MIS' apathy toward Unix is the predominance of IBM computers at the MIS level. According to International Data Corp. (IDC), a computer research firm based in Framingham, Mass., 71% of all installed mainframes are IBM systems. While IBM offers several versions of Unix, an IDC report on mainframes in the Unix market contends, "IBM reluctantly accepted AT&T's Unix System V, mainly because the government chose it as a standard." IBM does not actively promote its Unix versions, and its general policy appears to be that it will only sell Unix to customers who request it. It seems that without a strong endorsement from IBM, MIS directors are unlikely to purchase Unix-based computers.

While IBM shop MIS directors state their indifference to Unix, others see potential in it. John Johnson, vice-president of DP for the First Federal Savings Bank of Colorado, based in Lakewood, Colo., who basically runs a Sperry Corp. shop, says he is looking at installing Unix in the future. "We have had some discussion of using Unix to get a personal computer network," Johnson explains. "We're looking at the ability for users to develop applications that deal with their specific areas."

For Johnson, Sperry's endorsement of Unix is an important consideration. "Sperry has a much larger commitment to Unix than IBM," he notes. "I'm more of a mainframe person, so Sperry's support of Unix has influenced my decision."

Despite IBM's lack of support for Unix, some DP shops that were previously all IBM have begun to set up Unix departmental systems and are turning to other companies that can provide capabilities IBM cannot.

The United Virgina Bank in Richmond, Va., began setting up test sites several weeks ago, using an AT&T 3B2 minicomputer and two Unix PCs to offload its IBM 3081 and 3090 mainframes. The computers run versions of Information Builders, Inc. Focus relational data base management system (DBMS) and Quadratron Systems, Inc.'s Q-Office office automation software.

"When we started the office automation project," says Steve Dominick, who heads information center control for the bank, "we looked at IBM, and they did their dog-and-pony show. And we looked at AT&T, and they did theirs. AT&T came in cheapest, and a lot of people like what it can do because it has a single operating system."

Like all the Unix users *Computerworld Focus* spoke with, the bank considered portability a deciding factor in its purchase. "We like the concept of Unix; it kind of separates you from the hardware," Dominick explains. More importantly, Dominick says, a Unix-based computer offers potential savings. If the bank had an IBM System/36 and wanted to move to a System/38, Dominick points out, it would have to change the operating system. As a result, he says, "We would have to retrain our support team or hire new people," which can become very expensive. With Unix, a user just has to recompile the system software.

Additionally, the AT&T computers offer communications capabilities that the IBM systems do not. "We have an in-house private branch exchange phone system, and with AT&T we can use our own phone lines and switches," Dominick says.

This doesn't offer advantages for local terminals because Dominick uses coaxial cable to connect them to an AT&T 3B2 or IBM System/36.

However, with long-distance calls, Dominick explains, "A person can just dial in to connect to the 3B2. For the System/36, we would need to set up a dedicated line. With IBM, it's just not that easy and not that flexible."

Another incentive for choosing Unix-based computers is if an affiliated organization, company or department already has the operating system in place. The American Chemical Society (ACS) in Washington, D.C., is a nonprofit organization that uses two Digital Equipment Corp. VAX-11/785s with Unix System III to run Unify Corp.'s Unify relational DBMS, Access Technology, Inc.'s Supercomp 20 spreadsheet and Interactive System, Inc.'s Ined word processing package. "We chose Unix because our sister organization, Chemical Abstract Service [Columbus, Ohio], had already adopted Unix as a standard for office automation, and we decided to follow their lead," says Carole Shermer, head of office and information systems for the society.

GM's Williams' reason for backing the Unix System V standard for his firm's manufacturing facilities suggests that an increasing number of affiliated groups may turn to Unix-based computer systems. Williams states that GM adopted the standard because the company was "destroying" itself. "We're broken down into independent business units, and I'd be working on a project in my area while someone in another area was working on the same kind of project," Williams explains. "We'd find out two years later that we were working on the same thing. We could have worked together, but my installation had A company's computers, and his was using B company's computers."

By reason, GM should be able to save a considerable amount of time and energy in its research and development efforts, but it may take several years for the company to find out. GM has not actually installed any Unix-based systems, Williams says. "There may be some pocket areas where they are trying to develop transportable applications using Unix, but I don't know which ones are." Also, he says, Unix will be used primarily for new applications. "We want to maintain as much of our investment as possible," Williams explains. "You have to build a very good argument to replace an existing application." Thus, it may be a few years before GM installs any appreciable number of systems and is able to evaluate the cost-effectiveness of these systems.

Evaluating at a snail's pace

Many MIS directors who are staunch IBM customers are taking their time in evaluating Unix's utility. Compared with IBM's MVS and VM operating systems, Unix is relatively new and lacks many of IBM's sophisticated functions designed for business applications. Also, because of Unix's inception in Bell Laboratories' research labs and its association with the University of California at Berkeley, the system is not seen as a product for the corporate office but for the scientific and engineering arenas. Finally, it has been less than three years since AT&T began its promotion of Unix System V as an operating system for business applications and an industrywide standard.

Not surprisingly, a backhanded compliment about Unix by Daniel Yomine, director of corporate information systems for Chicago-based Sara Lee Corp., echoes that of many large, corporate MIS directors. "Unix is an excellent

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engineering product," Yomine says. "Once the Unix environment is more business-oriented, the fact that it can run on mainframes and PCs will make it a significant force."

An unfriendly system?

Many Unix users have concerns about the complexity and security of Unix, but they report that the potential benefits outweighed the system's weaknesses when it came time to make a purchase decision. For these users, the most critical issue is still user-friendliness.

"Unix assumes that you know about the system," ACS' Shermer says. "Users have to have a sense of the file structure and know the directory structures to use the system effectively." Shermer notes, though, that the operating system is fine for a programmer who can fine-tune Unix so that it performs functions automatically for the end user.

Most of the 220 users at ACS do not have what Shermer terms "computer sophistication." They are clerical workers, managers and professionals who primarily use the computer system's word processing software and are happy with the system, Shermer reports. "If you can equate happiness with dependency, that's what has happened over the past three years," she says. "Our users are more dependent on the system and more aware of its capabilities."

According to LaLuzerne at Honeywell, part of the user-friendliness problem in applications is the result of a lack of utilities in third-party applications software. For example, the operations people in the technical publishing group that use the Interleaf publishing system have had to program in the Unix shell language to set up routines and command files for putting files on tape.

"Interleaf did not supply us with the utilities for backing up the system," LaLuzerne explains. "We have to use system commands, and that's a real hassle." He noted that Honeywell was one of the first customers to report this problem to Interleaf. "Interleaf was not aware that they really needed them," LaLuzerne said. "Most people don't realize the backup they need, but the technical publications group already had a computer and knew what it needed."

Many of Interleaf's customers are print shops, LaLuzerne says. "Once their text is typeset, and the job is done, they can erase the old text," he explains. If a print shop loses a file, it hasn't really lost anything because the file would have been destroyed anyway, according to LaLuzerne. But at Honeywell, there is a lot of repeat business. "We may get a proposition," he says, "and six months later, a government contractor may ask for a similar system." The technical publications group will then pull information from an old file and modify it. "If you use a file repeatedly," LaLuzerne stresses, "you have to be guaranteed that it will be there."

LaLuzerne says that Interleaf is now looking into adding the utilities.

Despite the work that is required to allow users to back up their documents, LaLuzerne recommends Interleaf because if the technical publishing group has a Unix machine, it can add any other software it wants. "Previously," he explains, "they had purchased a system from [Penta Systems International, Inc.], and they could only run whatever software Penta had in stock."

Security is another concern of some Unix users. "An area where Unix has all the tools we need is data security," ACS' Shermer says, "but there are subtle ways of getting around commands that restrict access. A true hacker can use other commands to get around them." Because ACS has no high-security information, Shermer is not concerned. "A sophisticated user can view the data, but he shouldn't be able to obliterate it," she explains. She also notes, "This is a criticism that you can make of any other operating system."

In general, Unix users appear to feel that they have gotten the better end of the trade-off between the strengths and weaknesses of their Unix-based computer systems. Users who have been running Unix for more than a year state that they intend to purchase Unix-based products in the future.

The technical publishing group at Honeywell has used the Interleaf system for more than a year, and in other departments, some VAXs have been running Unix for as long as three years. LaLuzerne notes that while Honeywell uses several operating systems, he expects that the company will purchase more Unix-based computers. "When the mainframe gets overloaded, a lot of departments get departmental systems to off-load it, and some of those will probably be Unix systems," LaLuzerne points out.

"If we have a computer running one operating system, and we get a second computer, we'll probably stick with the same operating system."

At ACS, Shermer is working on acquiring several software products. ACS is planning to move from a System III-based version of Unix to DEC's Ultrix-32 with System V enhancements. "We're going to System V," she says, "because we see features that will help us. The ability to have concurrent users accessing the same file will be appreciated."

Shermer also is evaluating word processing applications in response to users' demands for a better package. "That's a good kind of complaint," she says. "It shows that the users know how to use the software, and they're saying that we can make it better."

Shermer adds: "As our computing grows more complex, we plan to continue buying Unix-based products." ◼

Hurst is a senior writer at Computerworld Focus.

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SPECIAL SECTION: APPLICATIONS OUTLOOK

Developing New Tools For Unix

DAVE RIDLEY

BY NICOLAS C. NIERENBERG

Unix was developed at AT&T Bell Laboratories as an operating system environment for software development. Given this, it is sometimes difficult to understand why more applications are not available for Unix and why Unix has not caught on more rapidly in MIS departments and the government. However, a look at the kinds of tools available to the Unix application developer coupled with a little knowledge of Unix history clarifies this situation.

Unix was created by programmers working in a technical environment for use by programmers working in a technical environment. As has often been the case when a product's creators are also a product's major audience, Unix ended up with many characteristics that are indecipherable to anyone else.

The Unix file system is one area that troubles commercial application developers. Unix was designed for a multiuser, software development environment, where each user was doing small jobs in a highly interactive mode. As a result, Unix's file system is oriented toward small text files.

These abilities are fine for programming, text processing, writing research papers and using many Unix facilities. However, they are not needed for many traditional mainstream business applications. Until very recently, Unix offered little in the way of shared management of data, file locking mechanisms or interprocess communications — with the exception of Pipes, the Unix command to pipe data from one task to another. Even Pipes, though, is geared toward the technical programmer and is only good at transmitting data between tightly coupled tasks.

Unix's history and development facilities should not shoulder all the blame. There is a second half to this equation — that is, the effects of DOS on the single-user and low-end Unix marketplaces.

The proliferation of IBM Personal Computers caused a rush of development tools and talent to focus on that market because the sheer number of systems made it too attractive for most software developers to resist. However, that rush diverted attention away from Unix just when it needed it most.

It was obvious even then that Unix was overkill for desktop, single-user PCs. Developers, however, began to divide applications between DOS and Unix by types. PC applications tended to have fewer lines of code and run smaller amounts of data. Unix applications tended to be bigger and more complicated and to handle more data. A recent survey of data base management system (DBMS) users bears this out. Only 25% had 20,000 or fewer records in their data base, while more than 35% had in excess of 100,000 or more records. The largest data base contained 1.2G bytes of data.

One last point: DOS raised expectations about what a good user application program should be. Help messages, windowing and other ease-of-use features became standard on most popular programs, and Unix had a hard time keeping up.

Current Unix development tools and environments are a series of trade-offs. Some are good at one type of application, some at another. No one tool is good for all things.

Four major kinds of tools are now prevalent: third-generation programming languages, relational DBMS, fourth-generation programming languages and application generators. Limited combinations of these tools are also common.

Despite the availability of many third-generation languages under Unix, only two — Cobol and C — play a major role. Of the two, Cobol makes up the most significant portion of the business applications, while C accounts for almost everything else.

Third-generation languages are highly flexible tools good for developing applications that are computational in origin and geared toward the input but not the manipulation of data. Word processing, computer-aided design and process control are prime examples.

Third-generation languages, however, bring with them many difficulties. They are complicated and require experienced (and expensive) programmers. They also require long development and debugging cycles and are expensive to maintain.

Relational DBMS were once pitched as replacements for third-generation languages. Instead, both are frequently used in combination. In this scenario, third-generation languages provide interactive programming while the relational DBMS does just about everything else — user interface, data manipulation, security.

Relational DBMS — the only kind to proliferate in the Unix community, by the way — shorten development cycles and give users greater flexibility in how they access data. Manufacturing requirements planning and accounting are popular business applications for which this tool is used. Nevertheless, many of the same problems still arise with third-generation languages because relational DBMS also require programming and debugging in complex applications.

Fourth-generation languages are higher level languages that are useful for developing business applications. Fourth-generation languages have some advantages over third-generation ones: They are easier to use and are often combined with a relational DBMS.

Unfortunately, fourth-generation languages have two main drawbacks. First, because they are programming languages, programming, testing and debugging are still required. And second, these tools frequently eat up valuable computer resources. Often larger machines with more memory are needed to run fourth-generation language-based applications.

Application generators are powerful programming tools that address many of the same needs as fourth-generation languages. But these generators have a singular advantage — they require no programming. Instead, they create programs by presenting a series of questions and menu options to the user. Their greatest strength is that they let an end user develop his own programs.

However, application generators are limited in their flexibility and customization capabilities. They simply can't ask all the questions needed to build every user's applications. The fact that no application generators have been tremendous commercial successes attests to their limitations. Those that have had moderate success tend to be application specific.

Relieving the user's load

In the past, software tools put most of the burden on the software developer or end user. But today, many users — especially in Fortune 1000 DP/MIS and government computer communities — demand that more of the nitty-gritty work of programming be provided as standard capabilities in prepackaged application development tools.

To meet this challenge, users should expect application development tool vendors to address the following areas: interactive development systems; front-end/back-end distribution of processing and bridges to other operating systems; the man/machine interface; networking and distributed applications; and artificial intelligence.

- **Interactive development systems.** These systems are a new class that combines the best of the current generation of tools in a smooth and easy manner, offsetting the weaknesses of one by integrating the benefits of another.

For instance, an application generator is good for screen presentation and user interfaces but a poor tool for programming.

On the other hand, a fourth-generation language is good for programming but poor at screen presentation and user interfaces.

A typical interactive development system includes a fourth-generation language, a relational DBMS, an application generator and sophisticated user interface capabilities. With such a tool, a generator can be used to get a new application up and running, while the fourth-generation language and DBMS can be used to finish it.

The addition of interactive development system abilities helps developers and DP/MIS management overcome application backlog by speeding the development process.

- **Front-end/back-end distribution and bridges to other**

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operating systems. PCs are priced so low today that they are becoming viable replacements for terminals in applications where response time is critical. As a result, many MIS and DP departments will want to take advantage of the extra processing resources and offload tasks to those desktop PCs to preserve valuable host mainframe resources.

In response, software development tools will have to be capable of interfacing both to the front-end PC user and the back-end mainframe, which will perform many of the data management tasks. Users will also require consistency of operation across terminal types. In other words, development tools will have to operate in exactly the same way on PCs as they do on dumb terminals.

> ”
>
> *Users will require consistency of operation across terminal types.*

Multivendor computing environments are a fact of life in the Fortune 1000. Application development tool vendors will address this in two ways. First, they will offer their products across a variety of operating environments. Second, development tools must be constructed so that applications developed under one operating system environment can easily move to another. In Unix's case, this means between DOS and Unix and, to a lesser extent, Unix and Digital Equipment Corp. VMS and Unix and IBM hosts.

- **User/system or man/machine interface.** PC-style applications such as Lotus Development Corp. 1-2-3 and Microsoft Windows are driving this technology. As a result, application development tools will have to be constructed to give software developers DOS-type interfaces to the end-user applications they develop. These facilities must be made available with a minimum of effort.
- **Local-area networks and distributed applications.** Development systems must provide developers with the tools necessary to accommodate such environments.
- **Artificial intelligence.** While the incorporation of AI techniques and expert system technology may be the most productive in terms of relieving the programming burden, they are at least five to 10 years away from practical applications. When they do come, AI techniques in development systems should help smooth the application development process by aiding the programmer in data definition and the linking of program and/or program fragments, programming logic and the like.

The Unix environment is not alone in needing to overcome a dearth of application software. The DP and MIS departments in the Fortune 1000 and government now face a seemingly overwhelming backlog of application requests from their users, a situation aggravated by the limited development tools available until just recently.

The Unix system, combined with fourth-generation tools such as relational DBMS, fourth-generation languages and application generators, can help MIS and government users get rid of the application backlog. This combination will provide sophisticated, reliable tools in a standard development environment. And because Unix is the DOS equivalent for multiuser systems, users will achieve maximum application portability.

Advanced development technologies, just now emerging, will combine with fourth-generation tools and set the stage for the next generation of applications. These tools will provide an expanding range of Unix applications that will offer sophisticated user interfaces, distributed processing capabilities, portability to DOS and other environments and, eventually, even AI techniques. ◼

Nierenberg is the president and chief executive officer of Lake Oswego, Ore.-based Unify Corp., a developer of software application products for the Unix and Microsoft Corp. MS-DOS markets.

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TECHNOLOGY INSIGHT

The Move To Integration

Unix's open architecture combined with the integratability of applications software and the creativity of the systems integrator will give the full power of micros to the business world.

• BY • ERWIN • MORTON •

In the complex maze of micro, mini and mainframe software, which comes in a variety of independent flavors, corporate MIS/DP management is looking for solutions to simultaneously pull together the increasing flow of information and offer more flexibility in data retrieval and manipulation. Attempts by corporations to standardize on one or two software packages to meet the needs of everyone have not been notably successful.

As acceptance of the Unix operating system grows, it is becoming possible to organize different applications and computer equipment into a single operating environment. The open architecture or integratability of Unix and of the applications software developed for Unix allows the MIS/DP department to choose packages from different vendors and integrate them into corporate software.

Not long ago, the office was seen as the archetypal horizontal market. It was widely assumed that the computing requirements of people in one office were the same as those in another. This implied that a few standard software packages could cover everyone's requirements. In practice, however, people have purchased a wide variety of software applications that now cannot work together or share data.

The office is not, in fact, a unified entity. It is appropriate to characterize each department in a corporation as a miniature vertical market composed of people with specialized needs. The MIS/DP manager has begun to pull together the appropriate software for these mini vertical markets and has become, in effect, an in-house systems integrator.

The Unix operating system provides an effective platform for creative systems integrators because the open architecture allows disparate third-party applications to communicate and share data dynamically in a multiuser, multitasking environment. Very powerful office systems can be created to perform functions that could not have been anticipated or provided for in an off-the-shelf IBM PC-DOS integrated package.

An integrated package built for DOS typically has one very powerful component, usually a spreadsheet or a relational data base. This central component becomes the primary selling point and is used by 90% of the users 90% of the time. The other components are usually too limited to be used effectively, and it is generally impossible to integrate separate packages from different vendors.

The problem with DOS-based integrated packages is that they are closed systems because DOS itself is a closed system. It may be possible to tailor a software package (create templates and so on), but the environment around the package cannot be changed or enhanced.

The key advantage of the open architecture or integratability of Unix software is that each application can become a building block for a system. Each application can be chosen because it is the best program for the job. The software can be mixed and matched — and tied together — to suit the needs of the department and the corporate strategy.

An off-the-shelf Unix package can invoke a second package, extract needed data, then use that data to drive a third package. In other words, systems integrators can build bridges between existing, independently developed applications.

System integration is extremely easy under Unix because applications from different software vendors can be hooked together. The sharing of applications can save months of development time, and at the same time, the MIS/DP manager or systems integrator can provide an office automation system that is tailored to the installation's specific needs.

Data transfer is facilitated by multitasking, file sharing, interprocess communications and Pipes. The shell (command interpreter) is a powerful prototyping tool: applications or modifications that would normally require substantial work to code can quickly be developed as shell scripts. Pipes permits tinkering — plugging together existing applications in new and useful ways.

Some Unix systems enable DOS to be run as a task, so that scripts, Pipes and so on can be used to enhance the DOS applications. Unix allows off-the-shelf DOS applications to transcend the limits of DOS.

Desktop publishing under Unix goes beyond mere page layout software. The marriage of off-the-shelf Unix word processing with standard Unix typesetting tools results in an extremely powerful system that can typeset an entire 500-page document in one sitting rather than prepare it page by page. The user can globally coordinate the formatting of a large number of documents. The ability to hide the mechanism and make the entire process transparent to the user is inherent in the software design.

When choosing integratable software for a multiuser environment, it is important to consider the user interface. The multiuser interface problem differs fundamentally from that on a personal computer. In the DOS world, one word processor can be acquired for the executive who puts out an occasional memo, and another, quite different one can be chosen for the secretary who is at the keyboard all day, as long as the two parties work independently.

When the decision has been made to establish a multiuser environment and coordinate the secretary, the professional staff, the middle manager and the executive, it is important to select a single software package that is accessible to both experienced and occasional users. Here are a few criteria for choosing a departmental or corporatewide software package:

- Predictability and consistency of the interface across a variety of hardware.
- Speed (both response and performance), so the software does not interrupt your train of thought and the system cost per user is kept to a minimum.
- Simplicity (both ease of learning and ease of use), so the package can be accessible to the occasional user, but not get in the way of the experienced user. One solution to this seeming paradox is to build a command syntax around soft keys that take on different functions, depending on the task, and that are unobtrusively self-documenting on the screen as they are being used.
- Context-sensitive assistance for every prompt, for every diagnostic and for every field of every menu.
- An interface based on a natural model of the office. A real office does not look like or work like a rectangular array (spreadsheet) or a set of ordered pairs or trees (data base). The natural office is largely composed of documents, filing systems and communications, with multiuser access and flexible methods of organization.

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> *When choosing integratable software for a multiuser environment, it is important to consider the user interface.*

Today users have the opportunity to use the open architecture of Unix, the integratability of the applications software and the creativity of the systems integrator. This dynamic synergy will help make the full power of today's micros available to the business world and provide the information tools necessary for the 1990s and beyond.

Morton is president and cofounder of Santa Clara, Calif.-based Syntactics Corp., a software development firm providing business applications packages for the Unix operating system. He has 15 years of experience in systems and scientific computing.

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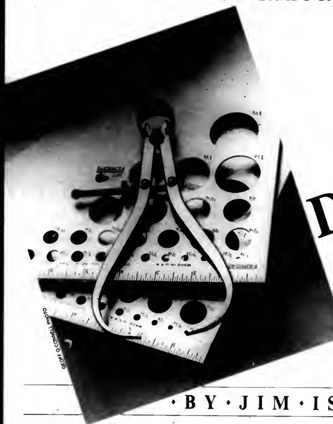
STANDARDS UPDATE



GEOFF O'CONNELL PHOTO

Designing A Standard

Based on Unix, IEEE 1003.1 is the first standardization of an operating system environment.

·BY·JIM·ISAAK·

The Institute of Electrical and Electronics Engineers (IEEE) has recently published the IEEE 1003.1 Trial Use Standard for Portable Operating Systems for Computer Environments. Based on the Unix operating system, it is the first standardization of an operating system environment and was developed from years of work by IEEE and /usr/group, the commercial Unix users group.

The standard has arrived in time to assist with the widespread adoption and specification of Unix-compatible systems by vendors and purchasers. For MIS and others in a corporation, it is important to understand what this standard does and does not address and future directions of the work. As a published standard, it can be referenced in conformance testing, purchasing specification and as a guide in development work.

The 1003 effort traces back to 1981 when /usr/group formed a standards committee to provide a base-level document for application portability. Language standards are limited in providing sufficient specification of the facilities needed for application portability. Many areas of I/O interfacing, memory and process management have been beyond the scope of language standards or subject to implementation-dependent characteristics.

By defining a standard for an operating system environment, another level of application portability can be attained. In 1984, /usr/group published the 1984 /Usr/Group Standard, which provided a base for both the IEEE 1003 effort and the C language standards work being done by the X3J11 committee. The /usr/group committee merged with the IEEE 1003 effort to provide a basis for raising the operating systems standards to American National Standards Institute (ANSI) and International Standards Organization (ISO) levels of acceptance.

In March 1985 the IEEE standards board adopted the 1003 document as a Trial Use Standard. Trial use implies that a follow-on document is planned that will provide additional materials to complete the standard and that will also incorporate feedback received during the trial use period.

While all ANSI standards require maintenance and updates, the IEEE Trial Use designation is a recognition of the value of widespread availability and is in use by implementors, application developers and buyers prior to a complete specification. The 1003 document contains a number of appendixes to describe functions that may be incorporated into a final version. The 1003 document is seeking to include terminal device control and a set of definitions of terms; however, both of these warrant feedback from the computer community prior to full use.

IEEE has established the trademark "Posix" for use by conforming systems and conforming applications. It is common practice to refer to popular standards by a trade name: take, for example, the name Multibus for IEEE 796 or Ethernet for IEEE 802.3. However, because, in the case of 1003, Unix is a trademark reserved by AT&T, the term Posix provides a generic title available for wider use. The name Posix is formed from a combination of portable operating system — POS — and the popular "ix" ending used in various operating system product names.

The value of a generic name associated with well-defined functionality can be seen in the specification of Unix-compatible operating systems. There are more than 100 systems vendors that run products compatible with or derived from variations of Unix. Most of these implementations are highly compatible, and Posix tries to characterize that common ground. The need for this common ground is clear: It has been estimated that about 70% of the U.S. government's requests for proposals for multiuser systems now specify some variation of Unix compatibility, and firms like General Motors Corp. and countries like Sweden are publicly moving toward the specification of a Unix-based standard for operating systems in a range of application areas.

Clear specification of the operating system environment is a concern for a number of groups.

The X Open group of manufacturers, which includes all the major European manufacturers as well as Digital Equipment Corp., Sperry Corp. and Hewlett-Packard Co., has adopted a Unix-based operating system model, added language and data base functions and provided a well-defined common application environment.

AT&T has published a document called the System V Interface Definition, which provides a specification of System V functionality, and has backed this up with a verification test suite.

The National Bureau of Standards (NBS) sponsored a set of software testing workshops in June with testing of a Posix-based Federal Information Processing Standard as one of the major workshops.

Fortunately, these efforts are not operating independently. X/Open, AT&T and NBS have all been quite active in the IEEE effort, and there has also been additional coordination between these groups. For the most part, Posix is a subset of the System V Interface Definition, and the System V Interface Definition is a subset of X/Open's Portability Guide.

Review by these groups with comments to both the 1003 group and others involved will tend to converge these documents even though subset relations will continue to exist because of the differing scope and objectives of the groups.

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> *The ultimate objective of any standard is to have vendors with implementations and buyers with purchasing specifications that build on that standard.*

The Posix effort is aggressively moving from trial use to a full-use document. This is currently targeted for approval in the summer/fall of 1987. IEEE has formally initiated the ISO process, recommending that a project be started through Technical Committee 97, Subcommittee 22.

If the timing is right, ISO feedback can be incorporated into the document in the IEEE approval cycle to avoid a level of variation and recycling.

In addition to the full-use effort of the 1003.1 group, other working groups and subgroups have not been idle. One of the most active areas is real-time extensions. Here a 1003 subcommittee exists along with a /usr/group technical committee and the General Motors Symposiums on Real Time Unix Systems. The coordination model is for requirements to be identified by the GM symposiums, implementation alternatives to be discussed in the /usr/group committees and actual proposed functional specifications to be finalized and incorporated by the 1003 subgroup. There is also a lot of common membership between these groups.

Two other working groups have been identified for complementary work to the Posix 1003.1 effort. A 1003.2 project has been approved that will address the shell- and tools-level facilities. The project is targeted at defining the facilities involved in application installation and as a method for applications to initiate services of some predefined application-level facilities.

This effort is not targeted at defining a user interface, because the value of the commonly available shells as ease-of-use, end-user interfaces is questionable. Finally, as a result of the NBS software testing workshops, an additional 1003 working group has been proposed to address verification testing criteria. Verification testing will be an essential element in the adoption of Posix as a Federal Information Processing Standard.

The Posix standard has limitations that affect the ways in which it may be useful in the traditional MIS world. It is an interface for the C language. While it would be possible to have Cobol, PL/I, Pascal, Fortran and other interfaces to a Posix environment, the document is based on C.

What is defined in 1003.1 is the system call interfaces, not the tools.

The 1003.2 effort will address this from the Unix-oriented users view, but buyers should seek application-level facilities for ease of use. (It has been suggested that users use applications, not operating systems.)

The facilities provided do not define methods for record management, indexed access to data files, transaction processing or networking. Some of these areas are outside the scope of Posix and are being addressed by the System V Interface Definition, X/Open and /usr/group technical committees. Other areas are potential candidates for 1003 action as extensions to Posix or as separate standards.

There are applications that can be developed within the current scope for Posix. There are currently systems that provide extensions, either at the operating system level, library level or data base management level, to address these areas.

Family resemblance

Finally, Posix looks a lot like the Unix operating system, which is similar to Honeywell, Inc. Multics (and other systems with a Multics heritage: DEC VMS, Prime Computer, Inc. Primos, Data General Corp. AOS, among others). Standards were designed to establish baseline functionality and measurable conformance, not perfection. One of the guidelines of the 1003 group has been to avoid breaking existing applications.

In general, quirks of Unix have remained, rather than logical improvements. However, there are points where the established approach was considered to be incorrect, and these changes have been made.

The ultimate objective of any standard is to have vendors with implementations and buyers with purchasing specifications that build on that standard. We have the first elements of this falling into place. There are widespread implementations of operating systems similar to Posix and widespread specification of Unix-compatible operating systems. These need to be compared with the Posix standard.

From this, statements of conformance can be established for both implementations and for applications. Also, buyers can start requiring at least a clear statement of exceptions, if not adherence to the Posix standard at this point.

One of the first federal specifications referring to the 1003.1 standard is forthcoming from the National Aeronautics and Space Administration Ames Research Center in California, with more expected as the Posix document gains visability. It will be at least six months before vendors can document their implementations and/or bring them into conformance; some will wait for the full-use document.

However, requiring statements about exceptions to the Posix standard and seeking both implementations and applications that conform to it is one key step buyers can take. It may be appropriate to designate a shell and set of tools, languages, data base facilities, networking and communications facilities as well as system characteristics such as disk capacity, memory, word size and bus standard.

A Posix Conforming Implementation would provide all of the required facilities from the 1003.1 Trial Use Standard as well as vendor-defined extensions. A Posix Conforming Application would document all facilities required outside of the 1003.1 document. This does not assure portability but provides a way for the buyer to make sure that the implementation provides the facilities required by the application.

Some areas of portability are beyond the scope of portability standards. For example, running an application from a 32-bit machine on a 16-bit system may never work due to differences in linear address space.

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> *Standards should be designed to establish baseline functionality and measurable conformance, not perfection. One of the guidelines of the 1003 group has been to avoid breaking existing applications.*

One of the appendix definitions is for a Posix Conforming Portable Application. Such an application would not use facilities that are not defined in the Posix standard or X3J11 C language standard. There is information useful in comparing both implementations and applications in the "limits.h" section of the standard and in Appendix H. These describe numeric values that may affect applications portability.

Feedback is strongly encouraged, particularly prior to this year's September and December meetings. This will permit comments to be incorporated into the revised version of the document.

To obtain copies of the IEEE 1003.1 Trial Use Standard, please contact the IEEE Computer Society at (714) 821-8380 or write to P.O. Box 80452, Worldway Postal Center, Los Angeles, Calif. 90080. The cost of a copy is $19.95 plus $5.00 for shipping.

To participate in one of the working groups, please send your name and address to Jim Isaak, Charles River Data Systems, Inc., 983 Concord St., Framingham, Mass. 01701.

Isaak is director of Strategic Marketing for Charles River Data Systems, Inc. He has been involved in the International Standards Organization Open Systems Interconnect, General Motors Corp. Manufacturing Automation Protocol and Boeing Computer Services Co. Technical and Office Protocol.

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Ten Ones!

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BY PHILIP J. GILL

Before going shopping for your Unix product, look at the following list of good buys to show you which tools pay off in terms of integration and price/performance.

A few years ago, any "watch" list might have mentioned that Unix products shared the following characteristics: a technical orientation, a bad user interface and sluggish performance. Things have changed since then, however. Many Unix tools today are business oriented and incorporate friendly interfaces, while hardware advances have overcome performance deficiencies.

The 10 Unix products examined in this article rely on characteristics that appeal to a wide user audience — namely, integration and price/performance. Integration is so important that the first five products deal almost exclusively with that topic, ranging from corporatewide, heterogeneous networks to the merger of DOS and Unix at the desktop level.

The remaining five are just plain, old-fashioned good buys and offer users performance that crosses critical price points. In the commercial area, price/performance approaches $2,000 per user, and on the technical side, price/performance breaks the $10,000 per million instructions per second (MIPS) barrier.

Numbers 1 and 2. The era of mixed-vendor, heterogeneous corporate networks is upon us, yet users are still struggling to come up with the means to make that environment a reality. Networking protocols are not enough. To provide transparent access to all resources on a network to all users, distributed file systems are needed. Two emerging distributed file system standards are Sun Microsystems, Inc.'s Network File System (NFS) and AT&T's Remote File System (RFS), which incorporates the Streams communications facility.

NFS and RFS provide an underlying structure for managing file systems, shared resources and transparent data base access across a mixed-vendor network. By using one (or both) of these Unix-based distributed file systems, corporations would be able to integrate incompatible hardware, some of which may be running different operating systems, into a single, cohesive network. Users at any workstation would then be able to access shared network resources including files, data bases and printers.

Both products work with AT&T Unix System V. However, NFS can also accommodate University of California at Berkeley versions of Unix, IBM PC-DOS and Digital Equipment Corp. VMS systems. Sun got an early lead against RFS and, so far, has signed up almost 60 NFS licensees including Hewlett-Packard Co., DEC, Data General Corp., Harris Corp. and more than 50 others.

However, RFS should not be counted out just yet. Rumored for months, RFS was officially unveiled at the June 1986 National Computer Conference in Las Vegas as an enhancement to AT&T's latest release of Unix, System V. 3. As such, it will be included with all Unix operating system licenses from now on.

Moreover, AT&T has indicated it will use RFS as a cornerstone of a new strategy to penetrate the Fortune 1000. AT&T will play up RFS' ability to connect diverse computers, pitching it as the backbone environment for integrating personal computers, minis and mainframes. The Streams facility is an important part of RFS because it provides a protocol-independent interface between different computers and networks.

In its initial release, Streams will support AT&T's Starlan local-area network. However, AT&T has committed itself to support other international networking standards such as the International Standards Organization's Open Systems Interconnect reference model, the U.S. Department of Defense's Transmission Control Protocol/Internet Protocol, General Motors Corp.'s Manufacturing Automation Protocol, Boeing Co.'s Technical and Office Protocol, the international IEEE packet-switching protocol X.25 and, eventually, IBM's Systems Network Architecture.

Numbers 3, 4 and 5. While NFS and RFS address the issue of corporatewide, distributed networks, a more immediate need — which way to go for multiuser applications — is at hand within the departments of many large firms.

Until not very long ago, users had to choose between multiuser Unix and Microsoft Corp. Xenix supermicros and networked PCs. That is no longer the case. Xenix-Net, developed jointly by Microsoft, Bellevue, Wash., and The Santa Cruz Operation, a Santa Cruz, Calif., Unix software house, lets users off the hook for now.

Xenix-Net provides networking, distributed file system capabilities and transparent file sharing in mixed environments consisting of Xenix System V.2- and DOS-based systems. With Xenix-Net, DOS users can open, read and write to files on a Xenix-based network file server, while other users are accessing the same file as well.

While Xenix-Net integrates DOS and Unix on a departmental basis, the integration of DOS and Unix at the desktop level remains the aim of two other products — Santa Monica, Calif.-based Locus Computing Corp.'s Multisystem Merge (also known as OS/Merge and Merge/286) and Interactive Systems Corp.'s recently announced joint venture with Phoenix Software Associates Ltd., the leading supplier of IBM PC-compatible read-only memory BIOS.

Locus' Multisystem Merge is best known as AT&T's Simul-Task facility for its PC 6300 Plus. Developed jointly by Locus and AT&T, the product was introduced last spring as OS/Merge with the PC 6300 Plus. Multisystem Merge, which requires an Intel Corp. 80286 microprocessor, currently runs only on the PC 6300 Plus.

Multisystem Merge weds Unix and DOS in the same single-user PC. With it, DOS applications can run as a task under Unix, a capability that offers users a combination of the best of both operating systems — the powerful communications and multitasking nature of Unix coupled with the sophisticated and easy-to-use software of the DOS world. In addition, Unix and DOS files can be accessed and manipulated transparently from either mode. Users simply toggle back and forth between DOS and Unix.

Competition in the field

Locus, however, is going to have some competition. Just a few weeks ago, Interactive Systems, a Santa Monica, Calif., Unix porting house, and Phoenix Software Associates disclosed that they have teamed up to combine Unix and DOS into a single environment on Intel's 32-bit, 80386 microprocessor.

Bernie Hill, Interactive Systems' director of systems and services, said the resulting product — to be called V 861X — will be available in two releases: a single-user version in the fourth quarter and a multiuser version about the middle of next year. Both will take advantage of the unique hardware capabilities of the 386 microprocessor, Hill explained.

The 386 permits multiple, virtual 8086 modes. This will allow multiple DOS programs to run as tasks under Unix System V. Currently, Multisystem Merge allows only one task to be run as a guest under Unix, though the firm is believed to be readying a 386 version of its own that overcomes that limitation.

Numbers 6, 7 and 8. Integration is one reason to watch some Unix products; more bang for the buck is the other. The Altos Computer Systems, Inc. 3068, DEC Microvax II and AT&T 3B2/310 — three multiuser supermicrocomputers — deliver some of the most aggressive price/performance in the multiuser market today.

According to Brian Boyle, managing director of the Novon Research Group, all three machines offer end users powerful multiuser configurations at prices under $2,000 per user, including a terminal.

"That's a magical price point," Boyle said. "At that price, the Altos 3068, DEC Microvax II and AT&T 3B2/310 begin to bump heads with the per-user cost of networked PCs, offering a powerful, cost-effective and cost-competitive alternative for departmental applications," Boyle said.

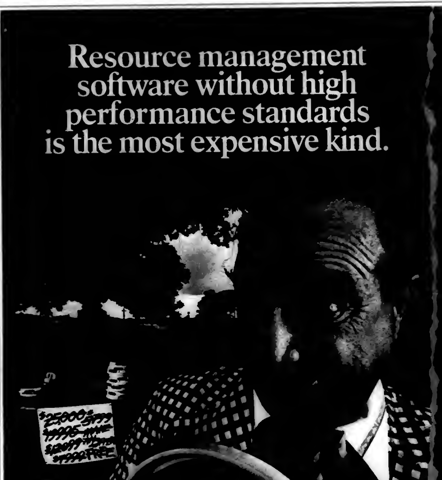
"People can't [complain] about Unix anymore," he added.

Among the things to watch for with these three is a possible port of DEC's All-In-1 integrated office software, popular among large corporations, to its Ultrix-32, AT&T Unix System V/University of California at Berkeley 4.2 operating system. This would make the Microvax II an attractive and cost-effective departmental office automation product at many corporations.

Number 9. With its Sun-3 workstation family, Sun has made quite a name for itself. The blend of off-the-shelf hardware and software (including Motorola, Inc. 68020 microprocessors and VMEbuses and Berkeley 4.2 Unix), an open architecture philosophy, industry-standard networking and aggressive pricing has earned this firm widespread recognition as the No. 2 company in the technical workstation market, moving up on market leader Apollo Computer, Inc., Chelmsford, Mass.

Sun customers today are usually confined to scientific, engineering, technical and university areas as well as computer-aided design applications in larger industrial concerns. However, Sun workstations are beginning to appear in the more mainstream precincts of the Fortune 1000 as well, usually in applications where an IBM Personal Computer AT just doesn't deliver enough horsepower.

For instance, the Sun-3 workstation family is a vehicle for corporate in-house electronic publishing systems and is the hardware of choice for one of


Resource management software without high performance standards is the most expensive kind.
FREE

those software products, Interleaf, Inc.'s Office Publishing System (OPS). Applix, Inc.'s Alis, a publishing-quality document preparation and office automation software system, is also frequently used on Sun workstations.

Sun also appears intent on retaining its technology and price/performance leadership. Earlier this month, Sun upped the ante on the price/performance end of the technical workstation market, introducing the 4-MIPS Sun-3/200 workstation. Based on a 25-MHz Motorola 68020 microprocessor, the 200 series is priced at $38,000 for a system with 8M bytes of main memory. That's $9,500 per MIPS, purportedly the lowest in its class. DEC VAXs cost an average $100,000 per MIPS, according to Sun.

Number 10. The IBM RT Personal Computer remains an important force to contend with in the Unix market if for no other reason than it is made by IBM. Without question, it indicates IBM is serious about Unix at last: The company has attended major Unix trade shows; it has aggressively discounted development systems for independent software vendors; it has offered PC-style documentation; and it has made available an abundance of technical information and free training classes.

More than a micro

The RT is also more than a PC. It can be a powerful multiuser system supporting up to eight users. A variety of business-oriented, commercial-grade applications software is already available and more is certainly on the way — all of which has many suspicious of IBM's ultimate intentions for the machine. Some suspect the RT could become an important departmental processor offering.

IBM has priced the RT aggressively — although not as aggressively as Sun's machines. According to one software house, a multiuser RT with a 150M-byte hard disk, a 120M-byte streaming tape drive and graphics capabilities is available to developers for about $24,000; a similar Sun-3 workstation configuration costs about $20,000.

Still, the RT is not without need for some improvements. IBM is aware of these shortcomings, and most expect the computer giant to address these needs shortly.

A second version of the machine based on a faster, more powerful version of the RT's 801 reduced instruction set computer (RISC) chip, networking and a sophisticated windowing system are among the enhancements that are expected soon.

Other Unix-based products that are worthy of attention include Sequent Computer Systems, Inc.'s Balance 8000 and Balance 21000 parallel processing systems; Interleaf's OPS in-house electronic publishing system; and MIPS Computer Systems, Inc. new RISC-based microprocessors.

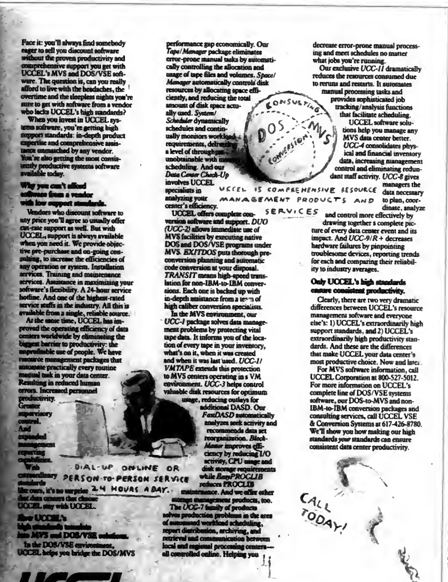
Sequent stands out because the company has done a great deal to educate and inform the computer-buying public on the issues of parallel processing. In addition, although the company's Balance computer series appears to be sold primarily to scientific and technical customers, the corporation's Balance computer series has begun to sell well in business environments also.

Interleaf is something of a standard for high-end, in-house electronic publishing applications among the Fortune 1000 companies. Interested parties should be on the lookout for the introduction of an Interleaf version for the MS-DOS environment.

Meanwhile, the MIPS Computer RISC-based microprocessors promise to bring even more power to desktop computers. Observers estimate the chip's processing capabilities at somewhere between 5 MIPS and 8 MIPS.

That kind of performance opens up entire new possibilities in desktop workstations, some equivalent in power to today's mainframes, in the years to come. Many, if not most, will be Unix based. ▣

Gill is a six-year veteran of the computer industry and the former editor-in-chief of Unix/World Magazine. *He is currently a free-lance writer living in San Mateo, Calif.*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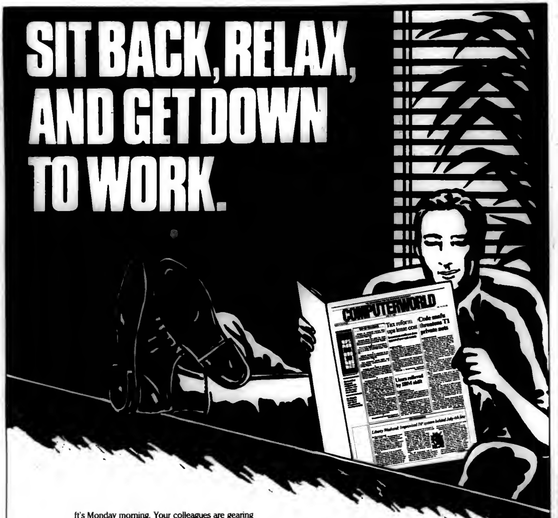
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The Unix Campaign in Europe

• BY • TONY • HEYWOOD •

Developed some 17 years ago by AT&T Bell Laboratories, Unix has become the standard operating system for modern multiuser computer systems. On both sides of the Atlantic, users have found that Unix satisfies their needs by providing machine independence; software portability; true multiuser, multitasking capabilities; and an environment in which programmers can be most efficient.

In the evolution of Unix as a viable operating system, the European computer industry and end-user base have traditionally followed the lead set by their American counterparts.

In terms of development cycle, innovations that take place in the U.S. generally migrate to Europe a year or two later. There are many reasons for this, but the primary reason is that that U.S. market is far larger than the European market. Therefore, the U.S. user base has encouraged the birth and growth of many more development companies.

Unusual in the history of business computing, Unix became available on both sides of the Atlantic at the same time, and while U.S. companies concentrated on their home market, European software companies began Unix development for the European end-user marketplace with little or no external competition. Without this competition, Unix developed as the operating system of choice in Europe and was recognized as such much earlier than in the U.S.

By the time the Unix concept was accepted in the U.S., many U.S. firms were already committed to installing large computer systems, generally supplied by a single manufacturer that for the most part did not support Unix. Such solutions created problems for users when the time came to upgrade or expand an existing system. In such instances, the costs and difficulties of adopting alternate hardware or software were out of proportion to the eventual benefits. At the very least, a change in hardware at this level requires all data to be transported across systems. At worst, these changes force users to become familiar with new applications software and new hardware and adopt new business procedures.

In contrast, the European user base began to consider the benefits of complete office automation when the Unix concept was already established in Europe. The Unix concept was first promoted abroad by a number of trade and technical magazines. In addition to adopting refinements to Unix made by U.S. vendors such as Microsoft Corp. and Unisoft Systems Corp., European software development houses also began their

GEOFF O'CONNELL

own enhancements to Unix, shaping the operating system for the European commercial market. While many European developments were several years ahead of contemporary market demands, the market itself was becoming aware of the capabilities and facilities of Unix — especially in an office environment. Trends in the U.S. business computer industry had indicated that Europe would eventually require complete OA systems; Unix was available at the right time and in the right place.

The U.S. and European Unix marketplaces are currently about the same size. However, the many separate countries of Europe present a series of unique problems that have contributed to the shaping of the European Unix industry.

A software product sold in the U.S. usually only needs to be available in English. A software product marketed in Europe needs to be available in at least four languages to achieve equal market penetration.

Second, because of the limited size of each country's market, a successful European-based company is by definition an international company. Many European corporations have offices throughout Europe, all of which need to communicate with one another. In the U.S., computer communications can be achieved by ensuring system compatibility throughout an organization. In Europe, the problems of system communications are more difficult. Even if European firms implement the same hardware throughout an organization and thus achieve system compatibility, they must still address the problems of applications software. For the same applications product to be run on all systems, it must be available in a variety of languages.

Third, European companies tend to be nationalistic and will support their own country's computer industry if possible.

Thus, a typical large European company consists of several offices located throughout Europe, each with a different spoken language, each with hardware supplied by different European manufacturers and each running different applications software.

Unix has ensured that the hardware installed in each European country supports the same applications software. The emergence of Unix encouraged many new European hardware manufacturers to design machines specifically to support Unix. Within a relatively short period following AT&T's commercial release of Unix, most European manufacturers had announced their intention to develop or support Unix-based systems. Conversely, major U.S. hardware manufacturers such as Digital Equipment Corp. and IBM continued to promote their own proprietary operating systems and have only within the last year committed resources to Unix.

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In doing so, U.S. hardware manufacturers presented Europe's relatively small computer manufacturing industry with an unequaled marketing opportunity. By adopting a common operating system, Europe's hardware manufacturers provided the basis for software and data compatibility. This provided the impetus for software development bouses to make their applications available in different languages. The timing of Unix in Europe encouraged an OA solution, whereby products provide all of the normally required OA routines such as word processing, data bases, spreadsheets and electronic mail in an integrated environment. This concept was very attractive to Europe's large multinational organizations because the same applications product was available for a variety of languages and a variety of computer systems.

Manufacturers and suppliers are not the only ones to contribute to Unix's success in Europe. Within Europe, many major system end users — such as the Swedish government and department of defense — adopted Unix at an early stage, providing further fuel for systems development and encouraging the adoption of the Unix operating system by other organizations. Systems development responded to the demands for OA.

In contrast to the U.S., European Unix manufacturers joined an independent standards committee for Unix — the X/Open Group — whose task was to adopt a single, standard operating system for European industry. The X/Open Group, among other things, established a standard for the creation, manipulation and management of indexed data files.

The slow acceptance of Unix in the U.S. may also be attributed to the recent growth of the single-user desktop computer market. This market spawned a rapid development cycle of powerful and attractive software that has had no equal in the Unix environment until very recently.

The migration of computers from the data processing department to the office desk, made possible by the birth of the low-cost business microcomputer, greatly influenced the packaging and presentation of business applications software. To be successful, applications packages had to be presented in a friendly and attractive way to a new generation of computer users. Simple menu structures lead the user through applications, comprehensive Help screens resolve any queries or problems that arise and business graphics and ergonomics are industry buzzwords. This packaging is one area in which the European Unix community has lagged behind the U.S.

The European user first encountered the PC business applications considerably later than the U.S. user. However, Europe now demands the same standards — but from a Unix system. The Unix market in the U.S., with its base in the scientific and technical community, has less of a requirement for such features. In Europe, however, Unix houses developed such standards of presentation along with their products.

While Unix is a powerful and comprehensive operating system, in its raw state it is best described as unfriendly. To counteract this, European companies have developed ergonomic, menu-driven front ends to Unix, allowing users to select options to invoke Unix routines. The menu structure is carried through various applications, providing common interfaces between the user and a range of features — which have become more extensive as complete OA products are announced.

Complete, integrated OA product

The OA part of Unix has evolved in Europe from a series of reasonably interrelated applications into a complete, integrated product combining word processor, spreadsheet, data base, electronic mail, diary and more. Two important enhancements to Unix developed in Europe are the implementation of Unix OA systems in vertical markets and the integration of Unix OA products with other Unix applications software.

With many European companies now installing major computer systems, European software houses have been quick to address the particular requirements of various professions. Because Unix OA products are written in the C programming language they can be tailored to specific professions with little additional investment and with substantial commercial benefits.

A legal OA system is cosmetically different from a medical OA system, but the routines, capabilities and features of the systems are identical. By tailoring such systems, many specialized European Unix companies have established themselves with various vertical markets and have further contributed to the growing success of Unix.

Unix also provides for the integration of a range of business applications within the European OA environment. The key to the acceptance of the Unix operating system within Europe has rested with the availability and compatibility of software applications, providing users with the opportunity to implement a complete system that provides data compatibility.

Unix emerged in Europe at a time when the commercial marketplace was becoming highly computerized. Unix provided the means for the same applications to run on different types of hardware and also allowed a high degree of data compatibility between applications. It has enabled companies to implement powerful multiuser systems that provide user-friendliness while solving European requirements for multilingual versions of the same product.

In the U.S., Unix is only now being recognized for its potential as an easily upgraded and portable standard solution for commerical operating environments. As the need for multiuser environments increases in U.S. industry, Unix will soon achieve a level of market penetration close to that already found in the European community.

Heywood is vice-president, marketing, for Dallas-based Uniplex Integration Systems, Inc. He has also participated in the development of software and office automation systems.

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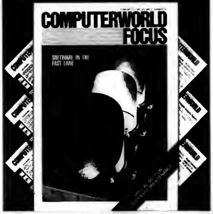
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NETWORK STRATEGIES

The Growth Of A Single Standard

• BY • MARK • KRIEGER •

GREG WENZEL

The debate over which solution is best for departmental computing applications in the corporate environment — networked personal computers or multiuser Unix-based supermicros — has been resolved at long last. The winner is Unix *and* DOS.

Confused? Don't be. Despite the sometimes acrimonious rancoring during the past few years over the two solutions to multiuser business applications, Unix and DOS are emerging as complementary rather than adversarial forces in today's corporate computing environment.

For many large corporations, the choice between networked DOS and multiuser Unix systems has never been the black-and-white issue their respective proponents have often portrayed it to be. Consider, for example, the following scenario that is now emerging in the departments of many large corporations. PCs are becoming the favored desktop workstations for managers and professionals in the Fortune 1000. In fact, PCs have become so ubiquitous at some large companies that they have even replaced many older, less intelligent desktop terminals such as IBM 3270s as well as other dedicated word processing and data processing systems. Typically, these PC-based desktop workstations perform a variety of personal productivity applications like word processing, spreadsheet and financial analysis, graphics and the like. Lotus Development Corp.'s 1-2-3 continues to be a favorite.

Meanwhile, although Unix systems have taken a backseat to PCs for many office applications, some firms have chosen to recast them in the role of departmental workstation instead of using large clusters of PC work groups. These Unix systems offer substantially more than large disk capacities. They provide a common shared data base, shared program development facilities, access to sophisticated printing and electronic publishing facilities, front-end communications processing and the ability to run compute-intensive tasks such as large spreadsheets.

In addition, numerous bridge products are available — such as Touchstone Software Corp.'s connectables family and Computerized Office Services, Inc.'s Tango — that enable PCs to act as front-end, desktop workstations hosted by Unix supermicros. AT&T has even gone so far as to merge DOS and Unix at the workstation level with its recently released Simul-Task feature for its AT-compatible PC 6300 Plus. This product enables DOS to run as a task under a standard AT&T Unix System V operating system.

With the push for departmental networking and multisystem links, Unix and MS-DOS are emerging as complementary rather than adversarial forces in today's corporate computing environment.

Moreover, current product and technology development trends such as heterogeneous file systems and distributed data bases assure that the merger — indeed, perhaps the marriage — of DOS and Unix is well under way.

The debate began when the first commercially oriented, Unix-based, multiuser computer was introduced at the 1980 National Computer Conference by the now-defunct Onyx Systems, Inc. The Onyx C8000 was based on the 16-bit, Zilog, Inc. Z8000 microprocessor and ran the first AT&T Unix Version 7 licensed to a commercial computer manufacturer. Previously, universities were the only places outside of AT&T itself to have Unix licenses.

Because the Unix micros had such aggressive price/performance, many people expected them to replace minicomputers for multiuser, small-business and Fortune 1000 departmental applications.

Such a grand future was not to be, however. Although other factors came into play, IBM's introduction of the Personal Computer, shortly after the Onyx C8000, proved the critical turning point. It was not long after that many corporate managers and professionals embraced the IBM PC as the preferred desktop computing device, leaving many Unix supermicrocomputer vendors without the mass market they had anticipated. Sales of Unix supermicros suffered.

Soon, however, both PC and Unix advocates realized networking and the sharing of information between individual PC users would become a necessity and, eventually, a priority. This would be especially true in the Fortune 1000 market.

The two camps quickly took sides and began leveling criticism at one another. Sometimes the

If the space program had advanced as fast as the computer industry, this might be the view from your office.

And space stations, Martian colonies and interstellar [illegible] be commonplace. Does that sound [illegible] these facts [illegible]

In 19[illegible]

[illegible] today a $2,000 portable can add and subtract more than 20 times faster. And by 199[illegible]

[illegible] personal comp[illegible]

[illegible] people managing and purchasing [illegible] personal computers for American business.

[illegible] Spain, Sweden, Switzerland, United Kingdom, United States, Venezuela, and West [illegible]

[illegible] today for [illegible]

debate grew acrimonious as each side sought to convince the computer-consuming public that only its solution would do

Current product, technology and market forces are creating complementary roles for Unix and DOS. First, it is clear that user preference for DOS and DOS-based applications software at the desktop level remains strong and virtually unchallenged. Despite many years and many millions of dollars worth of effort, Unix applications software remains less popular, less sophisticated and more expensive than DOS equivalents.

Second, the major microcomputer manufacturers have done little to promote the use of Unix or Microsoft Corp. Xenix on PCs. Without such a push, Unix or Xenix on PCs have been doomed from the start.

Third, DOS is growing up, becoming more sophisticated and more Unix-like with every release. Recent releases of Xenix and DOS C compilers are also helping to blur the distinctions

Unix leads MS-DOS in certain areas

At the same time, Unix's commanding lead over DOS in the areas of networking file sharing, heterogeneous file systems, distributed data base and communications capabilities continues to advance Networking and distributed data base technology are better developed for Unix than DOS

For instance, the U.S. Department of Defense's Transmission Control Protocol/Internet Protocol (TCP/IP) — a requirement in many research, defense and government computer networks — is a virtual standard in the Unix community. Little, however, has been done with DOS networks in this area. Moreover, many corporations have begun to realize the limits of PC networks What worked for three or four users is no longer effective for 23 or 24. For one thing, disk capacities on typical PC network file servers are limited to less than 100M bytes. On the other hand, it is not uncommon for Unix supermicros and minicomputers to offer many hundreds of megabytes of storage

DOS' hardware shortcomings are just the beginning. The sophistication of DOS networking software is also a limitation Unix provides industry-standard communications protocols such as TCP/IP and Ethernet, while work on other protocols such as IBM's Systems Network Architecture, 3270 and Document Content Architecture/Document Interchange Architecture is well under way Finally, Unix itself provides some interesting communications capabilities like advanced electronic mail functions and even interactive conversations between on-line terminals.

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> *Those who think that Unix needs to capture the desktop of commercial users from MS-DOS to succeed are wrong.*

Perhaps most important, DOS network manufacturers have not even begun to address the issues raised by the trend toward mixed-vendor, heterogenous networks. Under Unix, however, developments in this area are rapidly advancing Both Sun Microsystems, Inc.'s Network File System (NFS) and AT&T's Remote File System (RFS) enable a user on any computer in a mixed-vendor, heterogeneous network to access files and data anywhere in the network regardless of what hardware is being used, what operating system that hardware is running or where the data is physically located.

Moreover, Unix-based relational data base management system companies are developing distributed data base systems that provide the same function at the DBMS level over a similar network of disparate and incompatible computers as NFS and RFS seek to achieve at the network and file system level

These developments, different from anything for DOS networking environments, will further strengthen Unix's role as the backbone communications and integration tool for corporate computing environments.

The integration of DOS and Unix could offer users the best of both possible worlds With Unix as a background operating system, mixed-vendor, heterogeneous networks would be possible. In the corporate world, most users would opt for DOS-based, PC workstations to do 1-2-3 spreadsheets and word processing Unix-based supermicros or minis, meanwhile, would operate in the background, out of view and transparent to users.

These back-room, Unix-based computers would provide a wide variety of auxiliary computing services best handled by the more powerful processors on which they are based These services would include networking and electronic mail between individual PC users and other computers and work groups on the corporate network; off-loading communications for micro-to-mainframe links; providing common access to shared data bases of telephone directories, spelling dictionaries and the like, hosting expensive shared peripherals such as sophisticated laser printers, large-capacity disk drives and possibly even optical disks used for corporate archives, and off-loading other compute-intensive functions such as running large spreadsheets

Mix and match

This mixed environment would also allow for low-cost incremental growth of the network, as users could mix and match processor types and sizes. This ability would allow firms to tailor their networks to address specific functions and applications. Everything from micros to supercomputers could be added as needed.

For instance, array processors could off-load many of the iterative, numeric processing tasks now inefficiently done by more general-purpose systems in large companies.

Unix has always been adept at iterative numeric processing — just the kind of tasks that would be off-loaded onto the Unix-based background servers.

Moreover, dynamic load balancing, now only a pipedream for many MIS and DP managers, could become a reality. Excess processing tasks could be shifted from one system to another on the network not working at full capacity.

Finally, because Unix is inherently multiuser, corporations would be able to save on hardware costs. Companies would not be forced to purchase a new PC for each additional user as the network grows; casual users could easily be accommodated on the network by adding a much less expensive new terminal. The DOS-based networks, on the other hand, simply are not capable of providing these features and, likely, never will be

In general, a multiuser Unix system is recommended when a centralized, shared data base is at the core of the applications. Accounting, order entry and inventory systems are examples.

Additionally, despite decreasing hardware costs for both PCs and multiuser systems, multiuser systems continue to hold a price advantage over PCs when adding incremental users. If cost is critical, multiuser systems are generally recommended.

Finally, something must be said to dispel the myths surrounding Unix applications software The availability of Unix applications software is no longer an issue — but availability of PC-based software for shared network environments is

AT&T currently lists 500 packages in its 3B2 software catalog It has pledged to raise that to 1,200 to 1,500. There are, however, no official counts of software capable of operating in a shared mode across a PC network, although one Infocorp analyst recently suggested there were no more than 25 or so programs available. Of that, only one was an accounting program.

PCs, of course, remain the recommended and preferred solution in most corporate environments, especially when the applications require that computing power be dedicated to one user (such as in the case of large spreadsheets and financial analysis or heavy work processing).

Those who think that Unix needs to capture the desktop of commercial users from DOS to succeed are wrong. Unix, although not the favored operating system for desktop business applications in the Fortune 1000, has much to offer the commercial user. Networking and distributed files systems and data bases are just a few examples.

Unix's dynamic networking capability alone will encourage some commercial computing sites to use Unix-based systems to make up a back-end communications network. Unix will succeed in commercial computing, albeit not in the highly visible way its earliest advocates had assumed. ■

Krieger is president of Unipress Software, Inc., an Edison, N.J.-based publisher of Unix software.

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UNITECH

CIRCLE READER SERVICE NUMBER 270

UNIX PRODUCTS

HP RISC-Based Technical Series Bows

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced its first Unix-based technical computer system using the company's Precision Architecture, which is based on reduced instruction set computing (RISC) principles.

The HP 9000 Series 800 Model 840 machine uses the company's HP-UX Unix operating system, a 4.5 million instruction per second processor, up to 24M bytes of main memory and, the company claimed, up to twice the system throughput of the Model 550, the Model 840's predecessor. Bundled into the 840 is HP's Allbase/HP-UX data base management system, which is based on IBM's SQL.

The HP 9000 Series 800 Model 840 is priced at $113,500 and includes the system processor, floating-point coprocessor, 8M bytes of main memory, cabinet, power supply, central I/O channel, access port card set with six-channel multiplexer, HP-IB disk interface and a 16-user HP-UX with a C compiler, symbolic debugger, assembler, device I/O library, real-time package and Port/HP-UX for porting Hewlett-Packard's Real-Time Executive applications.

HP also announced that it is offering Logisticon, Inc.'s Dispatcher system for materials management applications; and the Minx Information System, a financial and manufacturing applications system from Minx Software, Inc., for the HP Model 840.

Dispatcher starts at $100,000, and the Minx system is priced at $25,000 for a four-user system.

In a separate announcement, HP introduced an 80286-based coprocessor interface card that provides IBM Personal Computer AT/Microsoft Corp. MS-DOS software compatibility to Hewlett-Packard's 9000 Series 300 technical workstation.

The 300 MS-DOS coprocessor package contains an Intel Corp. 80286 coprocessor direct I/O card (with a socket for the Intel 80287 coprocessor) and associated emulation software.

Hewlett-Packard said the coprocessor system requires either an HP-UX 5.1 application execution environment or the HP-UX programming environment and 2M bytes of total system random-access memory (RAM).

Special features include operation of MS-DOS as a task in the multiwindowing HP-UX environment; ASCII file transfer capability among HP-UX, MS-DOS and the Basic or Pascal operating systems; multiple personal computer-supported display adapter emulation; and software emulation of the Lotus/Intel/Microsoft Expanded Memory Specification, the vendor said.

HP's Intel 80286-based coprocessor interface card

The HP Series 300 MS-DOS coprocessor card costs $950. Also available is an HP Series 300 DOS/Memory enhancement kit (including 1M byte of RAM and the coprocessor system) for $2,195.

For further information, contact Hewlett-Packard Co., 3000 Hanover St., Palo Alto, Calif. 94303.

Circle Reader Service Number 259

Samna Unwraps Two WP Packages

ATLANTA — Samna Corp. has introduced Write Power 1 and Write Power 2, two software products resulting from a joint development effort with AT&T.

Samna said that Write Power 1 offers all the basics of word processing — such as underline, bold, justify, copy and so on — as well as features such as IBM Data Interchange Format and Document Content Architecture and ASCII. It also includes file transfer, mail merge, a pop-up telephone message window and the ability to use AT&T's Model 7500S Electronic Typewriter as an I/O device.

Write Power 2 contains the above features plus an integrated spreadsheet and Samna's Wordbase Manager, a facility enabling users to search through files on a disk to locate any word or group of words.

Both products also work with Microsoft Corp.'s MS-DOS operating system. Write Power 1 costs $495; Write Power 2 costs $745.

Two new versions of Samna+

Samna also announced two new versions of its Samna+ office automation software program, one for the AT&T Unix PC and the other for the IBM RT Personal Computer.

According to the company, the Unix version of Samna+ offers the following features: the ability for users to access Unix functions without closing the document on which they are working; the execution of shell commands without requiring users to first close the documents on which they are working; a terminal emulation program allowing personal computers such as the IBM Personal Computer and the AT&T PC 6300 to emulate terminals; support for windowing; and support for several types of printers.

The RT PC version of Samna+ supports workstations with a maximum of eight users and runs on IBM's Unix-based AIX operating system.

Samna+ for the Unix PC is priced at $745. The RT PC version is marketed and sold by IBM.

For further information, contact Samna Corp., 2700 N.E. Expwy., Atlanta, Ga. 30345.

Circle Reader Service Number 261

Plexus Offers 32-Bit, Entry-Level P/55 Machine

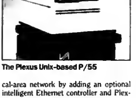
SAN JOSE, Calif. — Plexus Computers, Inc. has unveiled the P/55, a Unix-based computer system supporting up to 32 users.

The company called the P/55 an entry-level, 32-bit system, built around the Motorola, Inc. 68020 microprocessor and Plexus' Advanced Communications Processor (ACP).

In its basic configuration, the P/55 supports 16 users, 1M byte of main memory, a 72M-byte disk drive and a 60M-byte cartridge tape for backup. The maximum configuration includes an optional Motorola 68881 floating-point math coprocessor, two ACPs, 8M bytes of main memory, up to 435M bytes of high-speed disk storage with the addition of an optional storage expansion module and a 60M-byte cartridge backup tape, according to the vendor.

Plexus claimed its system flexibility allows an entry-level P/55 with 16 users and 72M bytes of disk storage to be field-upgraded to 32 users and 435M bytes of disk storage.

For further expansion, the company said multiple P/55s can be linked in a local-area network by adding an optional intelligent Ethernet controller and Plexus Network Operating System.



The Plexus Unix-based P/55

Plexus also announced Multiplex, a networking software package that links such IBM Personal Computer programs as Lotus Development Corp. 1-2-3 and Symphony and Ashton-Tate's Dbase II and Dbase III to Unix operating system data bases.

Plexus said Multiplex requires little retraining for most PC users, with Help menus provided, enabling users to string together frequently used commands that can then be executed with a single keystroke.

The product uses asynchronous telecommunications; Plexus computers and PCs are linked through RS-232 serial ports.

Pricing for Multiplex starts at $1,100, the vendor said.

The P/55 costs $25,250 in its base configuration, and prices for the storage expansion module begin at $11,000 for the cabinet and one disk.

For further information, contact Plexus Computers, Inc., 3833 N. First St., San Jose, Calif. 95134.

Circle Reader Service Number 260

Compaq PCs Get Multiuser Operating System

HOUSTON — Compaq Computer Corp. has introduced Xenix System V/286, a multiuser, multitasking operating system for the company's Deskpro 286 and Portable 286 personal computers.

The vendor said the Xenix System V/286 consists of three distinct modules.

The Base Operating System module contains the Microsoft Corp. Xenix kernel and standard utilities, including those to access Microsoft MS-DOS formatted disks.

The Software Development System module is said to contain a C compiler, a linker, a macro assembler, a source code control system and other software development utilities, including those for developing MS-DOS-based applications.

The Text Processing System module includes text formatters, macro packages and other document and word processing utilities, including spelling and grammar checkers, a typesetting program and a mathematical formula preprocessor.

Xenix System V/286 requires a minimum hardware configuration of a 20M-byte fixed disk drive, 512K bytes of random-access memory (RAM) and a 1.2M-byte floppy disk drive.

Using Compaq computers, the company said that three users may be logged onto the system at the same time, and more users can be added with the installation of a third-party multiport board.

Uses protected mode of 80286

According to Compaq, the System V/286 takes advantage of the protected mode of the 80286 microprocessor, providing memory management and protecting multiuser programs from accidental interaction, allowing the user to address the full 8.1M bytes of RAM available in the Deskpro 286 and 2.6M bytes in the Portable 286.

Compaq also claimed that the System V/286 offered some advantages over previously released versions of Xenix System III and Unix, including increased printer support in multiple configurations; easy transfer of files between MS-DOS and Xenix on fixed disks; and increased number of programmable keys.

The company added that System V/286 also allows the end user to install third-party device drivers without requiring the use of the software development package.

Finally, Compaq said that the product supports a range of third-party peripheral devices, including the IBM Enhanced Graphics Adapter and Display and the IBM Color/Graphics Adapter and Display.

Both the Base Operating System and the Software Development System have a suggested retail price of $599 each, while the Text Processing System has a suggested retail price of $199.

For additional information, contact Compaq Computer Corp., 20555 FM149, Houston, Texas 77070.

Circle Reader Service Number 262

Harris Unix Line Debuts

FT. LAUDERDALE, Fla. — Harris Corp. has introduced four new Unix-based supermicrocomputers and superminicomputers aimed at challenging Digital Equipment Corp.'s low-end and middle-range VAX product lines.

Both the Harris MCX-3 and MCX-5 series machines use the Motorola, Inc. 68020 microprocessor and are geared toward the computer-aided design and engineering markets. The MCX line includes the single-processor MCX-3 Model 40, the single- or dual-processor MCX-3 Model 60, the single- or dual-CPU MCX-5 Model 60 and the two- to four-CPU MCX-5 Model 70. Harris claimed the machines provided 1.5 million instructions per second (MIPS) for the basic CPU and 3.6 MIPS for each CPU with a floating-point accelerator.

The basic MCX processor is the pedestal-style MCX-3 Model 40, which contains two printed-circuit boards with a 16.7-MHz 68020 and room for a Motorola, Inc. 68881 floating-point processor. The processor also offers an 8K-byte cache memory, a 12M byte/sec. memory bus, up to 10M bytes of main memory and supports up to 12 users. The Model 40 costs $18,700.

The cabinet version MCX-5 Model 70 provides up to four processors and supports up to 64 users in high-performance applications such as real-time simulation, according to Harris. The Model 70 supports 4G bytes of virtual address space per process, 128M bytes of physical address space and 32M bytes of random-access memory. The system costs $73,000.

For further information, contact Harris Corp., 2101 W. Cyprus Creek Road, Ft. Lauderdale, Fla. 33309.

Circle Reader Service Number 263

Unipress Offers Shell Script Compiler

EDISON, N.J. — Unipress Software, Inc. has introduced Unishell, a Bourne shell script compiler.

The company explained that because shell scripts are simple to create, many Unix users write shell scripts rather than design and code programs in C or another language. This interpreting of shell scripts, rather than compiling them once, requires many more CPU cycles, the company claimed.

Unipress said that Unishell takes the shell script and translates it into the C language, compiles it using the system C compiler and then produces an executable program.

Unipress also claimed that Unishell programs run faster than shell scripts. The company said Unishell is available for a range of systems and costs $395 for micros, $695 for workstations, $995 for Digital Equipment Corp. VAX-11/750s or 780s and $2,500 for supermicros.

Source code is available for any size machine for $4,995.

For further information, contact Unipress Software, Inc., 2025 Lincoln Highway, Edison, N.J. 08817.

Circle Reader Service Number 264

Motorola's Series

SCHAUMBERG, Ill. — Motorola, Inc. has introduced the System 8000 and Vision/32 line of supermicros using its MC68020 32-bit microprocessor, VMEbus architecture and the company's System V/68 operating system, which is based on AT&T's Unix System V.

Motorola said the System 8000 comes in two models, the Model 200, which can support up to eight users, and the Model 400, which can support up to 32 users. Both systems can be configured with up to two 70M-byte Winchester disk drives, a 60M-byte streaming tape drive and controller, various speed impact and nonimpact printers and Motorola's Business Assistant Office Information Services software programs.

One of the newly announced Motorola System 8000 supermicrocomputers

The Model 400 is priced beginning at $22,335. The Model 200 is priced beginning at $15,690.

Motorola said its Vision/32 system is a low-end, on-line transaction processing product supporting one to eight users and comes bundled with Vision, the company's application development, data base and communications software. A minimum system configuration includes an expandable VMEbus chassis, a 16.67-MHz CPU, 2M bytes of random-access memory, a Winchester diskette controller, 67M-byte Winchester disk drive and streaming tape controller and drive. The system price begins at $17,195. For further information, contact Motorola Computer Systems, Inc., 10700 N. De Anza Boulevard, Cupertino, Calif. 95014.

Circle Reader Service Number 265

[redacted]

IBM PC ATs Get Unix Version

APTOS, Calif. — Microport Systems, Inc. has introduced the System V/AT, the company's Unix operating system for IBM Personal Computer ATs.

Microport described the System V/AT as a full adaptation of AT&T's Unix System V.2, Version 1. It contains the following features: a virtual screen windowing system; dynamic disk buffer allocation for random-access memory disk performance; a file system hardening feature, which the company said reduces the chance of data loss during a power failure; and several University of California at Berkeley Unix programs.

Microport claimed that because the System V/AT contains all of the advanced features present in AT&T's System V.2 and is binary compatible with the AT&T PC 6300 Plus Unix operating system, it will allow Microport to upgrade, "virtually overnight," to AT&T's Unix System V.3 versions for Intel Corp. 80286 and 80386-based machines.

System V/AT is available in three packages: the Runtime System, priced at $159; the Software Development System, priced at $169; and the Text Processing System, priced at $169. A single package of all three systems is available for $439.

For further information, contact Microport Systems, Inc., 10096 Soquel Drive, Aptos, Calif. 95003.

Circle Reader Service Number 266

Alcyon's Model 80-MP multiprocessor Unix system, shown in tower chassis

Alcyon Announces 10 Unix Systems

SAN DIEGO — Alcyon Corp. has introduced 10 single and multiprocessor, Motorola, Inc. VMEbus-based Unix systems.

The product line consists of the company's A68VME single-board VMEbus computers supporting one to 16 users and offering 10M to 40M bytes of hard-disk storage. Alcyon said the 10 systems are made up of five models, each model available in single or multiprocessor configurations. Alcyon's Regulus Unix operating system runs on the single-processor systems, and the company's Psos operating system kernel runs on the multiprocessor systems, which Alcyon claimed speeded up context switching time to 120 microseconds.

The company said its systems are geared toward such real-time applications as robotics, real-time data acquisition and control, medical/laboratory instrumentation, communications, computer-aided publishing and graphics.

Prices for the 10 systems range from $7,490 to $49,990. For further information, contact Alcyon Corp., 5010 Shoreham Place, San Diego, Calif. 92122.

Circle Reader Service Number 267

MMB Tool Introduced

ROLLING HILLS ESTATES, Calif. — Teamate, a software tool that enables Unix users to develop, organize, share and file data in a multiuser environment, has been introduced by MMB Development Corp.

MMB said that Teamate is available for multiuser computers, such as IBM Personal Computer ATs and Altos Computer Systems, Inc. machines running the Microsoft Corp. Xenix operating system.

The company claimed Teamate is an integrated system that can support any Xenix editor or word processor and data base management software while also supporting any terminals that can be hard-wired or linked by phone lines to the host processor.

Teamate's features

Features MMB listed for Teamate include multiuser outline mode; dynamic data base entry and reorganization; any type of binary data handled as entry attachments, including graphics, Ashton-Tate's Dbase and Lotus Development Corp. 1-2-3 data; computer conferencing; a full on-line Help facility; direct interface to any Unix file: and integrated backup and recovery. MMB added that Teamate users can utilize any name up to 72 characters in length to describe the contents of their files.

Teamate costs $3,990 for the Altos 2086 system and $1,995 for the IBM PC AT. A separate IBM PC AT Teamate Upgrade Kit (which includes Santa Cruz Operation, Xenix System V, Relational Data Base Systems, Inc. Informix, Santa Cruz's Lyrix word processing system, memory expanded to 2M bytes and four serial port expansion) is also available for $4,500.

For further information, contact MMB Development Corp., 753 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

Circle Reader Service Number 268

CIRCLE READER SERVICE NUMBER 277

UNIX PRODUCTS

Venturcom Software Creation Environment Targets Unix V.3

CAMBRIDGE, Mass. — Venturcom, Inc. has introduced for the AT&T Unix System V.3 a version of its Prelude Information Management System, an environment for creating software for specific, data-intensive applications.

Venturcom said that the modular structure of Prelude allows the product to take full advantage of the Remote File Sharing (RFS) and Streams connectivity features in System V.3 and allows it to overcome the physical boundaries between machines. The company said that Prelude provides several tools for developers to create applications.

At its most basic level, Prelude reportedly uses all the features of the Unix command interpreter, known as the shell, while also providing menu programs that organise options for the end user.

Quickly builds customized screens

According to Venturcom, the Prelude system's forms entry program quickly builds customized screens for applications in which data entry fields are embedded or extensive validation is required.

Lastly, Prelude's programmable information component allows application developers to give context-sensitive Help on specific applications, the vendor claimed.

The company said that Prelude's architecture allows users to gain access to shared files, within security restraints, from an IBM Personal Computer disk drive, a file server or a minicomputer tape drive.

Prelude works on all IBM Personal Computers and compatibles running under Venturcom's Venix operating system, Digital Equipment Corp.'s VAX computers and AT&T's 3B computers running AT&T Unix System V, Venturcom said.

Prelude's communications facilities work with AT&T's Starlan or Ethernet cabling and Excelan, Inc. networking cards.

Pricing for Prelude is based on hardware configurations and number of users.

A minimum two-user license for IBM PC XTs costs $1,800.

A configuration of 16 PC XTs linked with a DEC VAX supporting another 16 terminals is priced at $57,600, the vendor said.

For further information, contact Venturcom, Inc., 215 First St., Cambridge, Mass. 02142.

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Sybase Releases Relational DBMS

BERKELEY, Calif. — Sybase, Inc. has announced a relational data base management system providing networking architecture.

The product consists of two components: the Dataserver, a relational DBMS that runs on supermicros and minicomputers providing data simultaneously to a variety of computers; and the Data Workbench, a visual interface that Sybase said requires no programming for doing queries, reports, applications and data base design. The Data Workbench runs on hosts ranging from personal computers and bit-map workstations to minis.

Sybase claimed the Dataserver can support more than 100 users accessing multigigabyte data bases and still provide a subsecond response time. Users can continue to utilize the data base during backup or schema changes, and the Dataserver can be used during recovery of one or more data bases, the company said.

Sybase said the Data Workbench contains the Visually Oriented Query Language, allowing users to construct SQL statements using menus and icons. The Data Workbench also contains the Report Writer for defining reports and the Application Writer, a visual tool for specifying data entry forms, designing menus and defining pre- or postprocessing for fields and forms. The product uses icons and windows and is compatible with both bit-map and character terminals.

Sybase claimed its products have solved the problems of distributing applications, maintaining centralized control and updating multiple data bases that are involved in networking relational DBMS. These problems are overcome, the company claimed, by storing the application in the data base, providing integrity in the Dataserver rather than in the Data Workbench and by providing a distributed transaction system.

The first release of the Dataserver is on Sun Microsystems, Inc.'s Sun-3 workstations running under University of California at Berkeley Version 4.2 of Unix. The Data Workbench will be available on bit-map and Digital Equipment Corp. VT100-compatible terminals. The Dataserver costs $18,000 to $90,000, depending on the size of the CPU. The Data Workbench costs $1,000 to $30,000 depending on the hardware selected.

Contact Sybase, Inc., Suite 110, 2910 Seventh St., Berkeley, Calif. 94710.

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Sun Tools Out

MOUNTAIN VIEW, Calif. — Two new products that provide compatibility with the IBM Personal Computer AT and allow Microsoft Corp. MS-DOS applications to run in a window under Unix have been introduced by Sun Microsystems, Inc.

The Sun Integrated Personal Computer (SunIPC) is a 10-MHz Intel Corp. 80286 coprocessor board for Sun workstations, and the PC-NFS is software for IBM Personal Computers and compatibles that the company said allows them to access files transparently and network peripherals through the Sun Network File System (NFS) on an Ethernet network.

The SunIPC board has 1M byte of memory and supports the Lotus/Intel/Microsoft Expanded Memory Specification, enabling PC applications running on a Sun workstation to access up to 4M bytes of memory. The SunIPC is a Motorola, Inc. VMEbus board that executes color or monochrome applications written for MS-DOS requiring either the IBM AT color graphics adapter or the Hercules Computer Technology, Inc. monochrome adapter.

The company said its SunIPC carries one parallel port and allows the use of two workstation ports as standard serial ports. An optional 8-MHz Intel 80287 math coprocessor as well as external 1.2M-byte and 360K-byte floppy disk drives for MS-DOS software access and transport are also available.

SunIPC includes MS-DOS 3.1, Microsoft's GW Basic, transparent file sharing software for NFS and utilities to convert ASCII files between MS-DOS and the Sun operating system.

PC-NFS is a client version of NFS that runs on IBM PCs and compatibles. The company claimed that by using a PC or compatible with as little as 512K bytes of main memory and one floppy disk drive a user can enter standard DOS commands to access files from any other computer on the network including workstations, minicomputers and even supercomputers.

The PC-NFS software automatically converts local MS-DOS file names to network-compatible NFS path names. Although other network users cannot directly access files residing on the PC, Sun said the micro user of PC-NFS can transparently save local files on a network server where other users can also share them.

Offers printer spooler to Sun units

The company added that in addition to transparent file sharing, PC-NFS offers printer spooling to Sun Laserwriters on the network.

According to Sun, PC-NFS prices vary for different unit volumes and product configuration. In quantities of 100, the PC-NFS software with documentation sells for $305 per unit or $255 per unit for the software alone. When bundled with an Ethernet interface and documentation, the per-unit price of PC-NFS for quantities of 100 is $955.

The SunIPC board is $1,995 in single quantities, and the accompanying software is $395 for the single-user version. The multiaccess version is $995.

For further information, contact Sun Microsystems, Inc., 2550 Garcia Ave., Mountain View, Calif. 94043.

Circle Reader Service Number 271

Implementation of Information Builders' Focus 4GL/DBMS To Run Under Unix On AT&T 3B Machines

NEW ORLEANS — Information Builders, Inc. has introduced an implementation of its mainframe Focus fourth-generation language and data base management system to run under the Unix operating system on AT&T's family of 3B computers.

The company said its Unix Focus contains features such as a dialogue manager for generating user-driven, interactive procedures. The products also contains a maintenance facility to collect, validate and monitor data for multiple file processing.

Additional features include a screen manager for development of CRT screens for data entry/display; a full screen editor for the creation of Information Builder's Focus procedures and test files; data base management, whereby transaction processing is done through English statements; and reports and ad hoc request generation.

AI features help productivity

Artificial intelligence-based facilities allow new users to become productive quickly. According to the company, the product also features bidirectional transfer of data and source files between a Unix computer and an IBM mainframe through either an asynchronous connection or an IBM 3270 emulator card provided by AT&T.

Unix Focus is priced from $2,895 for the low-end AT&T 3B2/300 and $44,000 for the AT&T 3B20 computer, the vendor said.

For additional information, contact Information Builders, Inc., 1250 Broadway, New York, N.Y. 10001.

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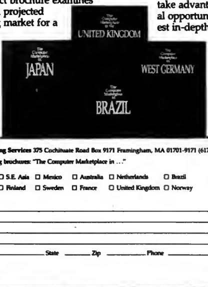

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